Volume 73 No 9
September 2005

Amateur Radio

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The magazine for AUSTRALIAN radio amateurs

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operating in Bogong High Plains

plus

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Ron Holmes VK5VH

An HF – 6 metre antenna diplexer
Keith Gooley VK5OQ

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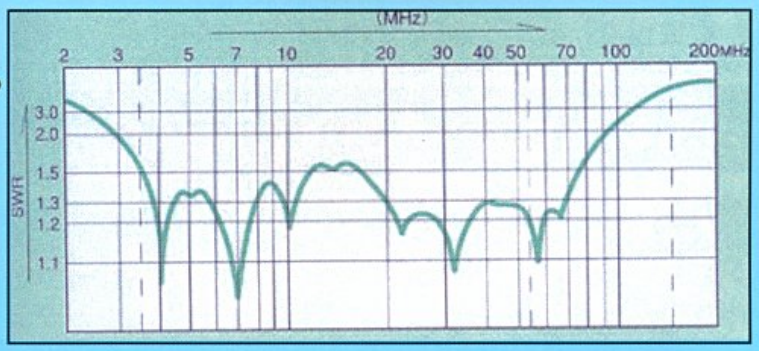

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GENERAL

TECHNICAL

COLUMNS

Our Cover this month

A group of intrepid adventurers brave Victoria's High Country for a winter DXpedition. Read Stephen VK3JNH's story on page 13

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the National Office on receipt of a stamped self-addressed envelope.

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Wireless Institute of Australia

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The Australian Amateur Radio Service

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Editorial comment

Colwyn Low VK5UE

Tidying up

Well the Toyota Rally of SA has been run, I have been tidying up in the dark on Saturday evening and setting up in the dark on Sunday morning (@#$#@ cold!). Did not have to say nasty words, as all worked well. On the side though, got back to overnight accommodation, could not find mobile phone, all very dark, borrowed another phone went to the Beetle and rang my phone, it answered, so I knew I had not lost it, just mislaid it. However it was the following morning as I unpacked the gear before I actually found it!

WICEN SA and the Rally organisers are all very pleased with whole operation. I would like some short notes and pictures from other states on WICEN operations or exercises. However readers are not really interested so much in Jim and Bill, as they are in the equipment and any novel solutions to problems. So please bear this in mind when you select the pictures.

I am glad to see that the WIA organisation has the new examination system in motion and that we should be able to stage new style exams in a month or two. It will be very interesting to see where the first Foundation licence is issued. I would like details and a picture for the magazine.

The RD contest really buzzed this year. Unfortunately I was only able to sit in the shack for a couple of hours over Saturday and Sunday. I was quite surprised to hear numbers near or just over 500 late on Sunday. The new format certainly provided more contacts. The rework rule would have helped but the operators still have to spend time to work the calls. I'm sure some slept well into Monday after their long stints. Congratulations to all who participated. Now please write up the log and send it in. I have decided to look at computer logging (Ian Godsil VK3JS sparked me into action). There was a good program from John Dean, VK5DJ, download from http://vk5dj.mountgambier.org . I did not have a laptop to take out to the shack to sit beside the transceiver. Not much room in my shed, certainly not for a big box and monitor. Fortunately I now have an not too old Toshiba Satellite Pro with a battery that will work for a few hours so I have run out of excuses for the Oceania Contest. All I have to do now is choose an appropriate logging program I can relate to. I have looked at EI5DI's site www.ei5di.com and downloaded the SD programs. There are 17 pages in the manual but the programs cover a lot of specific contests as well as a general logging program for HF and another for VHF contests. So now I am reading and playing to get the feel before I try it on in a real contest.

Good luck with all your amateur radio activities. Remember to keep experimenting and make the odd mistake because I have been told, "If you never make a mistake you never make anything!"

73 Colwyn VK5UE.

September events

ALARAMEET
9th to 12th September 2005
http://users.ncable.com.au/gsyme/AlaraMeet/

2005 Wadda Cup Contest
24 September, 2005

Michael Owen VK3KI

The system develops

It was last December that I first wrote about moving to a competency based training of accredited assessors, asking the question, what do you think?

By April, when I next wrote about it, I had become convinced that the ability to undertake practical assessments and to provide candidates with an immediate result and immediate guidance where further work was needed to achieve competency had surprising support, even though for most aspiring assessors it meant giving up a full weekend.

Last month I was able to say that the WIA was going ahead to accredit assessors, with the assurance of the ACMA that certificates of proficiency would be issued on qualification by the WIA on the basis of certification by WIA accredited assessors.

We have now finalised the two basic documents describing the system. The first describes the general principles and the qualification and accreditation procedure and is called "WIA Exam Service Assessment Process in Amateur Radio" and replaces the "Assessment of Competency in Amateur Radio" March 2005.

The other, which parallels the existing WIA Exam Service Instructions, is called the "WIA Exam Service Assessment Instructions". Both are on the WIA website.

It is a basic principle of the assessment system that the assessors must be fully familiar with the activities being carried out by the candidate during an assessment and have substantial experience in carrying out similar activities, and a requirement for the assessor to be competent in the examination being assessed. Accordingly WIA Assessors and Nominated Assessors will hold the Advanced or equivalent amateur licence (today the unrestricted, limited or intermediate licences)

There will be two levels of assessor; a WIA Assessor is someone who has been qualified by a Registered Training Organisation registered in accordance with the Australian Quality Training Framework, (an RTO), and accredited and registered by the WIA as a WIA Assessor.

It is the WIA Assessor who will assess the practical module and who can mark the written papers for all three levels of licence.

The other assessor, the Nominated Assessor, is someone qualified by an RTO and accredited and registered by the WIA as a Nominated Assessor. The Nominated Assessor's responsibilities include assisting WIA Assessors in carrying out assessments, auditing WIA Assessors and assessments, determining Recognition of Prior Learning assessments and undertaking Special Assessments, that is assessment of candidates suffering a disability, or remote assessments.

The Nominated Assessor has additional qualifications.

Recognition of Prior Learning is the recognition of current qualifications, and we have been very lucky as a number of people with relevant current qualifications have volunteered to assist. These people, when they can demonstrate a knowledge of the WIA amateur radio examination assessment system, will be qualified by the RTO and can then be accredited and registered by the WIA as either WIA Assessors or Nominated Assessors as recommended by the RTO without attending a further training course.

These steps will ensure that the system will acquire and retain the credibility it needs to encourage candidates to seek to qualify from the assessors and to become amateurs, after all that's what it's really all about.

The first training courses will be conducted in Adelaide on 27 and 28 August, Brisbane (Gold Coast) on 10 and 11 September, Melbourne on 17 and 18 September and Sydney on 24 and 25 September.

With those already almost qualified with existing current qualifications, and with those attending the training courses, I expect that we will have some dozen or so Nominated Assessors and some 60 or so WIA Assessors, covering the country from southern Tasmania to the Queensland tablelands, from Perth to Darwin to Alice Springs, and all the major cities.

An important reason for the move to a qualified assessor was the need to examine the practical module of the Foundation licence qualification.

The practical module will become an essential element of amateur qualification in Australia, ordinarily as a part of the Foundation certificate assessment. However if the candidate is attempting the Standard or Advanced certificate as a first qualification he/she will have to complete the practical module. Candidates will be exempt from the practical module if they held an amateur licence or amateur qualification prior to the Determinations coming into force.

A WIA Assessor will be required to undertake the practical assessment.

But the WIA Assessor will also be able to mark all written papers for Foundation, Standard and Advanced theory and Standard and Advanced Regulation, meeting the need to provide an immediate result for candidates who are judged competent and immediate guidance for candidates needing more work to become competent.

It is imperative that the methods we adopt ensure that what we do has credibility. That is, there can be no suspicion of improper practices, or different levels being allowed to develop in different places.

We are establishing a system of Foundation Packs to enable each relevant document to be tracked. We will continue to use the examination material requests for specific candidates that we presently use for the other examinations. Each WIA Assessor and his/her assessments will be audited annually, and each WIA Assessor will have to apply for re-registration every three years.

We believe that these steps will ensure that the system will acquire and retain the credibility it needs to encourage candidates to seek to qualify from the

continued on page 18

WIA News

WIA appoints a National Repeater Coordinator

With all licensing now centralised in Canberra and the ACMA requirement that all applications for a repeater are submitted with WIA endorsement, it has become necessary for the WIA Board to appoint one person to act as the liaison with the state Technical Advisory Committees and the ACMA office in Canberra.

The Board has appointed Peter Mill, VK3APO/VK3ZPP to this position. Peter has a wealth of experience in repeater operation and frequency allocation, starting in the late 60's with his attendance at the first National VHF band planning meeting held in Albury - Wodonga.

Peter's duties include;

- Consulting with the state Technical Advisory Committees on all matters relating to new repeater licence application and repeater band plans;
- Providing letters of endorsement for new repeater applications for the ACMA, as required and approved;
- Providing an information flow to and from the WIA Board on all matters relating to repeaters;
- Providing a report in respect of repeaters and repeater band plans as requested for each Open Forum or other meeting following each Annual General Meeting, and
- Undertaking such other coordinating tasks in relation to repeaters as are requested and agreed from time to time.

The appointment, except the first appointment, is annual, by the Board after each annual general meeting.

Peter can be contacted via email at pbmill@froggy.com.au

Three WIA stations operate in the RD contest

This year at least three WIA stations operated in the RD contest, VK2WIA, in the Hunter Valley in the heart of wine country, at the Luskintyre aviation museum, VK3WIA at the ScienceWorks museum in Spotswood and VK6WIA from the QTH of the hard working awards manager, Mal VK6LC.

WIA Board invites comment on Draft Postal Ballot for Director Regulations placed on website

Clause 14.1 (c) of the WIA Constitution says, in part that "The Board may determine that the election of Directors be conducted by postal ballot with the result of the election to be announced at the annual general meeting. A postal ballot shall be conducted in accordance with the regulations made by the Board from time to time."

The Board has decided that the election of Directors shall be conducted by postal ballot. If the election were confined to those in attendance at the AGM, the members from one geographic area would be favoured, and so a postal ballot is seen as the only fair way.

As the first election of directors will take place at the next AGM early next year, the Board has approved a draft of the regulations and placed it on the WIA website, www.wia.org.au, for members to read. If you have any suggestions or comments, send them to the WIA Secretary, either by mail to the national office or by email to secretary@wia.org.au by 20 September 2005.

Italy joins no-code ranks as FCC revives Morse debate in the US

The ARRL reports that Italy is to be the latest country to no longer require amateur radio applicants to pass a Morse code examination to gain HF access. The Daily DX reported this week that current IW-prefix "no-code" VHF/UHF licensees in Italy now will be allowed operate on HF and may also apply for new callsigns if they wish. Canada eliminated Morse code as the "sole additional requirement" for HF access in late July. To date, more than two dozen countries around the world - including such major players as the United Kingdom, Germany, Australia and New Zealand - no longer require amateur radio applicants to pass a Morse code examination to operate on frequencies below 30 MHz. If the FCC's past observations on the subject are any clue, the US could be joining the no-code-required club in the future.

WIA appoints National QSL Bureau Coordinator

The WIA undertook as part of the transition from a federal to a national structure to provide a QSL service at no charge to its members. The WIA Board has formulated a policy which continues to rely on existing individuals and groups, achieving economies of scale by concentrating outward QSLs through the Westlakes club.

The Board decided to appoint the existing VK6 QSL manager, Neil Penfold, VK6NE to fill this position. The Board felt a dedicated manager is required to manage and promote this aspect of the WIA's commitment to its members.

Neil's duties will include:

- Ensure all stakeholders are fully informed and understand the respective roles required to deliver the WIA's QSL commitment;
- Coordinate the activities of all in relation to outward QSL services;
- Ensure that the QSL service effectively meets the needs of members in a cost efficient way;
- Develop improvements to QSL service;
- Maintain an overview of the financial aspects of the service;
- Promote the WIA QSL service as a benefit of membership, and publicise

New From LDG Electronics DTS-4 Desktop Coaxial Switch

It can be tough switching between your 6-over-6 Yagi; your 4 element Quad, your 600' terminated Rhombic, and your full-size 160 meter vertical. I know I just hate it; crawling under the desk, wrangling stiff pigtails of RG-213 up to the rig. Even if you use a coax switch, most of them have the connectors splayed out at all angles, leaving the coax running all over the place, taking up half the desk. And then, you have to be able to reach the switch knob, so all that RG-213 is right there in your face.

So you get all that sorted out, you're at your local ham club meeting one evening when a killer lighting storms sweeps through, and you find yourself wondering if you remembered to set the switch to ground your antennas. If not,

A dual band CW transceiver

Part 2

Dale Hughes VK2DSH
PO Box 7430, Sutton, NSW 2620

The previous part of this article described the CPU and DDS module, along with the transmitter. The remaining sections of the transceiver are described in the following pages. Also provided are alignment details, technical references and component suppliers.

Receiver details – attenuator, preselection filter and amplifier

RF input from the antenna is applied to the preselector board (figure 6) which consists of a switchable attenuator, two selectable band-pass filters and an amplifier. Band-pass filters are selected according to the receive frequency and keep strong out-of-band signals and noise from the amplifier and mixer. The attenuator has four settings: 0, 6, 12 and 18 db and the CPU is programmed to default to the 6 db setting. Otherwise they are set according to need by the operator. The RF amplifier is a common design which uses transformer feedback to provide input and output impedances that are close to 50 ohms over a wide range of frequencies. Other suitable transistors types are 2N3866 or 2N4427, if the specified transistor is not available.

The schematic of the preselector board is shown in Fig 6. T1 is 15 bifilar turns on an Amidon T50-J or T50-43 toroidal core. Winding details for the band-pass filter inductors (L1, L2, L3 and L4) are given in table 2.

Component	160 m Band	80 m Band
L1 & L2	8.2 µH, 24 turns, T50-15 core, 0.4 mm wire	
C1 & C7	220 pF	
C2 & C5	560 pF	
C3 & C6	5 – 65 pF	
C4	33 pF	
L3 & L4		8.2 µH, 24 turns, T50-15 core, 0.4 mm wire
C8 & C14		82 pF
C9 & C12		120 pF
C10 & C13		5 – 65 pF
C11		8.2 pF

Table 2: Band-pass filter component values. Capacitors should be either polystyrene, silver-mica or polyester types. Ceramic capacitors are not suitable

The band-pass filters can be changed to suit other bands if required, table 2 shows the component values for the existing version which operates on 160 and 80 m.

Receiver details – quadrature mixer

Signals from the preselector filter and amplifier are passed to a pair of mixers through a conventional 3 db coupler made up of T1 and a 100 ohm balancing resistor. As the receiver uses a phasing method to reject an unwanted sideband (or image frequency) a pair of local oscillator signals in phase quadrature is required. A 74HC74 dual flip-flop is configured to generate the quadrature signals, and these are fed to the mixer switches in anti-phase. Figure 8 shows the timing relationship between the RF input and the RF output in quadrature phase at half the input frequency. Note components R19 and C22, they form a time delay circuit (approximately 10 ns) which compensates for the propagation delay of signals through U6c. Without compensation, the accuracy of the 90 degree phase relationship at the output of the 74HC74 dividers is degraded, which results in reduced image suppression at the receiver output. For example, without the delay compensation the image rejection was measured to be 20 db, when the compensation was included the image rejection was measured to be 47 db.

The schematic of the mixer board is shown in Fig 7. T1 is 18 bifilar turns on an Amidon T50-J or T50-43 core, T2 and T3 are 12 '5filar' turns wound on Amidon T50-J or T50-43 cores. '5filar' is five wires twisted together before winding on the core. Wire size is 0.24 mm for T1, T2 and T3, using different coloured enamel wires for each winding helps winding identification.

The carrier quadrature phase generator timing diagram is shown in Fig 8.The dashed lines are the signal without the delay compensation (R19 & C22) and show how the 90 degree phase relationship is degraded by allowing the output of U5 to toggle early.

The mixers are a variation of the 'H-mode' design which is reputed to produce a mixer with very good signal handling ability. This variation eliminates the need for multiple transformers which are required in the conventional version; this design requires a transformer with five windings on a small toroidal core. The advantage of the 'H-mode' design is that one side of the mixer switches is connected to ground and this eliminates the variation in gate 'on and off' resistance due to the local oscillator drive that can degrade the strong signal capability of switching type mixers. Hawker[1] gives a good discussion of these mixers and their attributes. The amplifiers at the mixer output (U2 and U4) provide significant gain at audio frequencies, the audio output then passes through a low-pass filter to remove noise and unwanted frequencies before the signals are passed to the phasing network.

All resistors in the signal path are 1% tolerance devices and capacitors C11 and C12 are matched to 1%. The use of accurately matched components helps to ensure that the gain and phase relationship of both mixer outputs is matched and that the rejection of the unwanted sideband (audio image in this case) is maximised. A rule of thumb states that 40 db of image rejection requires that there be no more than 0.1 db amplitude difference and 1 degree of phase difference between the I and Q signal paths.

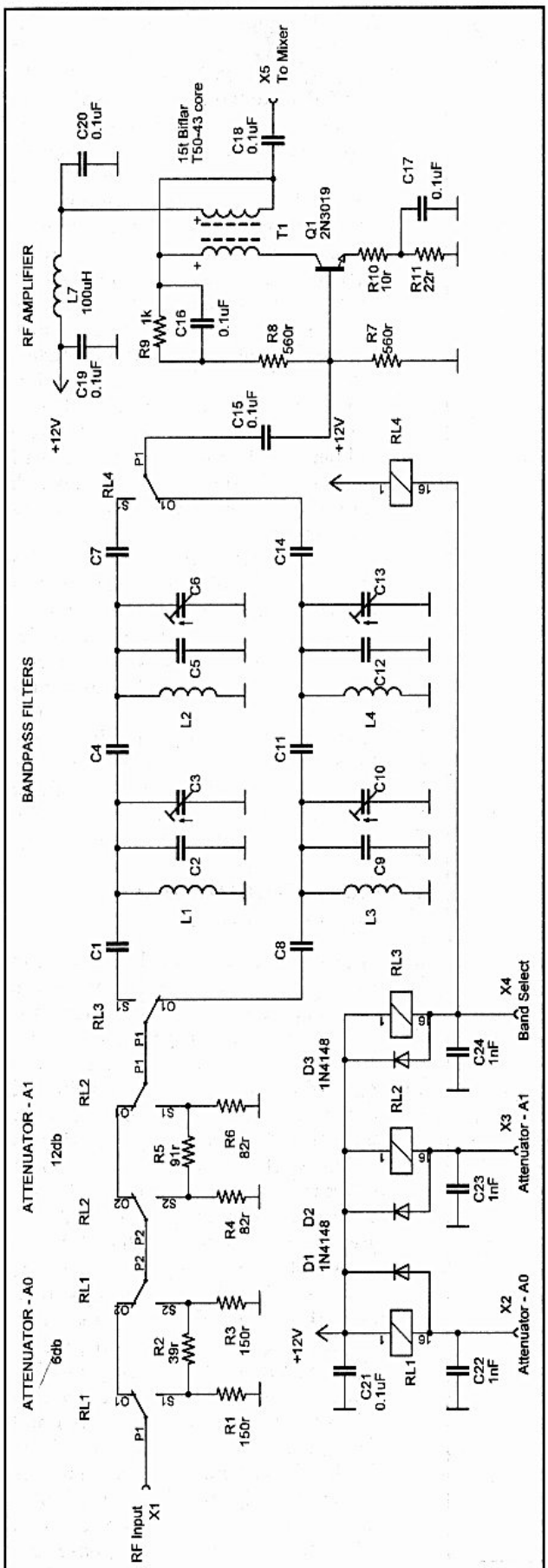

Figure 6: Schematic diagram of the preselector board.

Receiver details – phasing network and filter

The two audio signals in phase quadrature (I & Q signals paths) from the mixer board are passed through an all-pass filter which maintains an accurate 90 degree phase difference between the two channels over the range of speech frequencies. The output from each mixer channel is phase shifted and then added together, and as a result of the quadrature phase relationship between the audio paths and the local oscillator, the audio image (the unwanted sideband) is cancelled out. Small amplitude differences between the I and Q channels can be corrected by means of potentiometer VR1 at the summing junction.

This design is taken from Hayward, Campbell & Larkin[2] which gives a very good description of how phasing networks function. The phasing network resistors are standard 1% tolerance and the required values were made up from series connected resistors. The capacitors were hand selected from a bulk purchase of 100 polyester capacitors and were chosen from the batch so that all the capacitors used had matching values. The NE5532 dual amplifiers have a wide bandwidth and low noise, making them ideal for this application.

As is common with standard direct conversion receivers, all selectivity is obtained at audio frequencies, so a band-pass filter is placed between the phase network output and the audio output. The network shown has upper and lower cut-off frequencies of 2.7 kHz and 300 Hz respectively. Hayward et al[2] gives designs for additional narrow band CW filters.

Receiver details – audio output and side tone oscillator

This small board performs two functions:

- In receive mode, the receiver output passes to an audio amplifier which drives headphones or a small loud speaker.
- During transmit, the receiver audio is disconnected and a 'twin T' oscillator generates a tone when the transmitter is keyed.

Oscillator transistor Q1 is switched by Q2, and the frequency of operation is set by R2, R3, R4, C1, C2 and C3. With the values shown, the side tone is approximately 700 Hz. The output level of the side tone can be set by adjusting the level potentiometer (VR1) on the circuit board. The output amplifier is one half of a dual power amplifier and the maximum audio output is approximately 1 watt.

The schematic of the audio amplifier and side tone generator is shown in Fig 10. Note that the PTT signal from the Morse key routes through this board to the opto-isolator (Fig 4) board and CPU board (Fig 3). This simplified wiring in the prototype unit.

General construction

As the intention was for the transceiver to be a portable, battery powered device, most of the circuitry is installed inside a diecast box 222 mm long, 146 mm wide and 55 mm deep (Jaycar # HB-5050). It's a bit of a squeeze to fit everything in, so the transmitter and receiver modules are

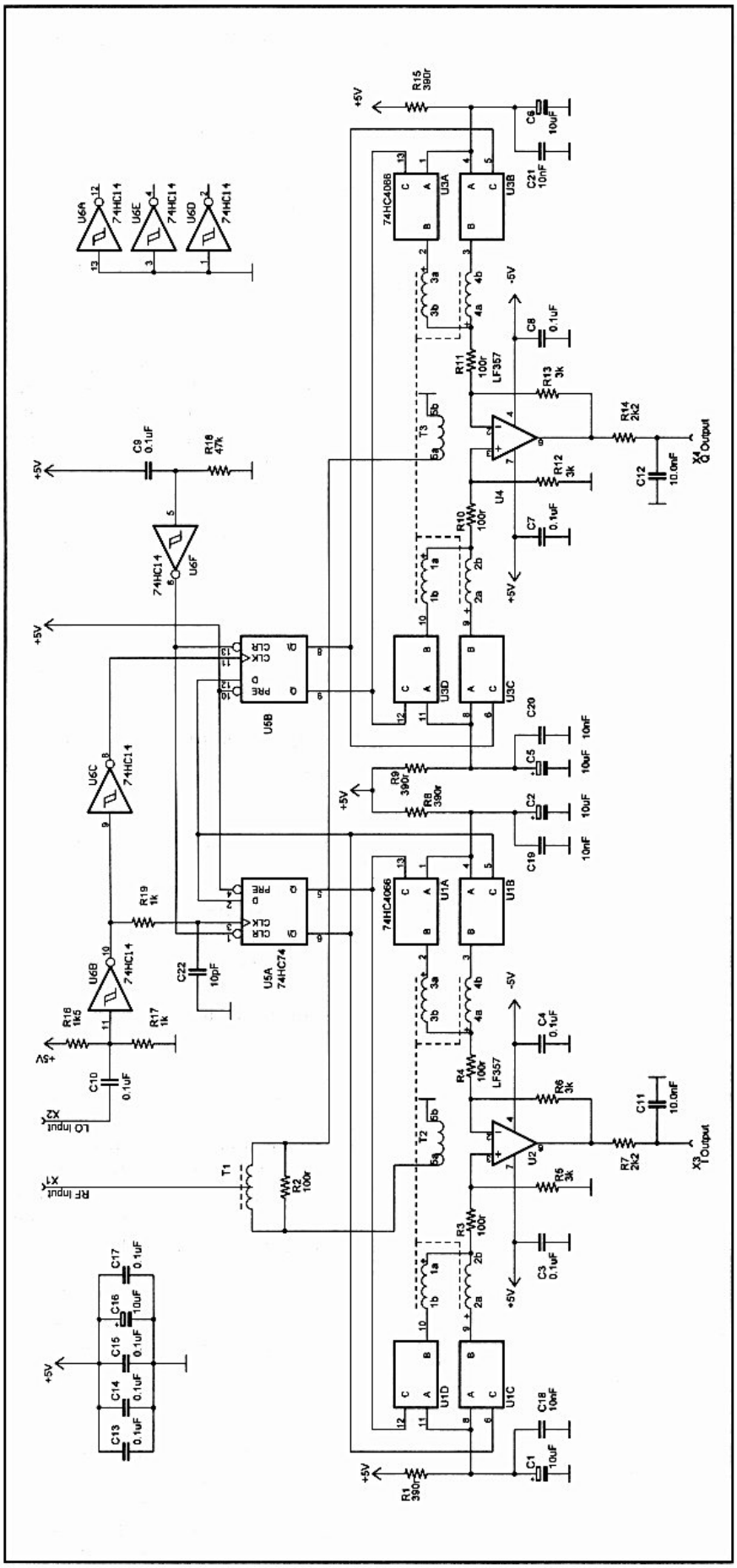

Figure 7: Schematic diagram of the mixer board.

mounted on the bottom of the box and the CPU, opto-coupler, keyboard, LCD and audio board are mounted on the lid of the box, see figure 11 for details. The CPU, keyboard and display are separately screened using double-sided printed circuit board laminate. Signals into, and out of, the CPU module are passed via feed-through capacitors.

Covering the transmitter and receiver modules is a separate screen and all signals into and out of these modules are via feed-through capacitors. Extensive filtering and screening significantly reduce the potential spurious signals generated by the high speed digital components (CPU etc). The DC-DC converters which generate the positive and negative 5 volts supplies are fitted inside another small diecast box which connects to the transceiver using screened cable.

See Fig 11 for an internal view of the transceiver showing the placement of the various modules. On the bottom of the box the transmitter module is on the left-hand side, the preselector module is in the middle, the audio phase shift network is top right and the mixer is bottom right. A screen usually covers the modules in the bottom of the box. The lid holds the side-tone and amplifier module, the opto-interface and the CPU-DDS module (beneath the PCB screen).

Adjustments and conclusion

An advantage of this design is that there are very few adjustments before the receiver is usable, and none for the transmitter. The preselector band pass filters need to be tuned to the required frequency and this is achieved by adjusting the trimmer capacitors in the filters. So that image rejection is optimised, it is important that the phase difference between the receiver mixers is as close to 90 degrees as possible. As the quadrature generator is a digital device no adjustment should be necessary, however the delay compensation network can be trimmed if required. Amplitude balance can be trimmed by adjusting VR1 on the phasing board to minimise reception of the unwanted sideband. Tune to a strong signal and then tune through zero beat; if the amplitude balance or phase shift is inaccurate a signal will be heard. Stay tuned to the unwanted sideband and adjust the local oscillator phase and

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New From LDG Electronics — DTS-4 Desktop Coaxial Switch

It can be tough switching between your 6-over-6 Yagi; your 4 element Quad, your 600' terminated Rhombic, and your full-size 160 meter vertical. Crawling under the desk, wrangling stiff pigtails of RG-213 up to the rig. Even with a coax switch, most have the connectors at all angles, leaving the coax running all over the place, taking up half the desk. And then, you have to be able to reach the switch knob, so all that RG-213 is right there in your face.

So you get all that sorted, you're out when a killer lighting storms occurs, "Did I set the switch to Ground?" If not, will you have a smoking heap of rubble where your rig was.

Help is at hand. The LDG DTS-4 Desktop Coaxial Switch is made for hams, by hams, to solve these very problems.

With the DTS-4 you can instantly switch your rig between 4 antennas with the press of a button. All five coax sockets (4 inputs and one output to your rig) are lined up across the back of the switch, so all the coax can run straight back.

This means the DTS-4 will fit in just about anywhere on your desk. A bright red LED indicates the antenna in use. At a touch of the control buttons, all inputs are grounded, helping to protect your radio from Mother Nature.

Remember that lightning? The DTS-4 can sense when your rig is turned off, and automatically ground all antenna inputs!

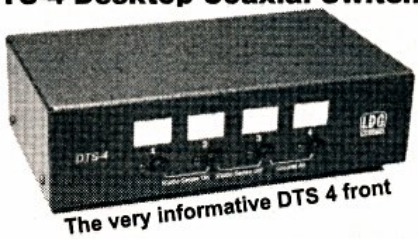
You simply run a line from a DC-out port on your rig (most modern rigs have at least one) to the DTS-4 and set it to Radio Sense mode with a simple button-press. From then on you're protected; . Power up and the DTS-4 automatically resets to the last used antenna. Use your radio's auto power off feature and it will even protect you if you forget!

But that's just the beginning! How about remote-mounting the DTS-4, say on the floor under the desk, or even in the basement to keep all that pesky coax at bay, and using a compact remote control box on your operating desk?

The DTS-4R remote control fills the bill, with a full set of control buttons and indicator lights, but only a single, slim control cable running to the remote DTS-4 switch.

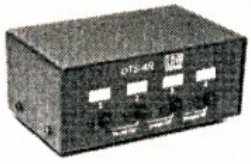
The DTS-4 handles up to 1500 watts of RF power on HF (1000W on 6M), and can be used with any coax-fed antenna. The Radio Sense feature needs at least 2 volts from your rig, at 1 mA current. The DTS-4 features Teflon SO-239 connectors, and requires an external 12 VDC power supply at 250 mA. If the external power supply fails, all inputs are grounded, so it's fail-safe. Switching is done by rugged, sealed industrial relays.

Add the DTS-4 and DTS-4R to your shack soon; it's the modern coax switch you've been waiting for.



The very informative DTS 4 front

The highly organised back



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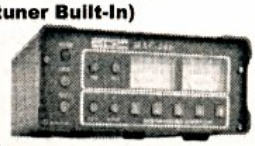
MAC-200

MASTER ANTENNA CONTROLLER
(Smartuner Built-In)

Control up to 5 Antennas



Select the right antenna, for the right band, at the right time with the MAC-200. The Master Antenna Controller operates as your base station control center, eliminating complicated switching and tuning. With the MAC-200, you can select between up to five antennas and tune automatically to minimum SWR. You can monitor your power and SWR with two convenient meters on the front panel of the unit. The MAC-200 puts you in control of your antennas.

Full info available—ask

SG-237 Smartuner™

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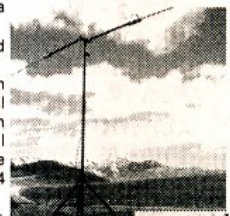
- "Packcloth" carry bag thermo-plastic carry case; ops manual.



Model 516 Argonaut V IF-DSP QRP Transceiver

IF-DSP in a modern 20 watt HF trans-ceiver. 20 watts output power, all modes. SSB, CW, digital modes, and FM. Front panel adjustable from 1-20 watts output. AM operation at 5 watts carrier power (20 watts PEP). Metering measures forward or reflected power in switchable 2 or 20 watt scales.

phasing network amplitude balance until the signal can no longer be heard. The phase relationship of the mixer local oscillator can be checked by looking at the I and Q outputs of the mixer with an oscilloscope. The oscilloscope should be set to the X-Y mode and the inputs to the oscilloscope should be connected to the I and Q mixer outputs. Tune the receiver to a strong signal and observe the output from the mixers, a circle, or ellipse should be seen on the oscilloscope screen. Figure 12 shows what might be seen, the left hand trace shows the result when the phase relationship between the mixer local oscillators is not ninety degrees. The right hand trace shows the result – a perfect circle – when the local oscillator inputs are in phase quadrature. The phase angle can be calculated using:

$$\sin\theta = \frac{Y\,\text{int}}{Y\,\text{max}}$$

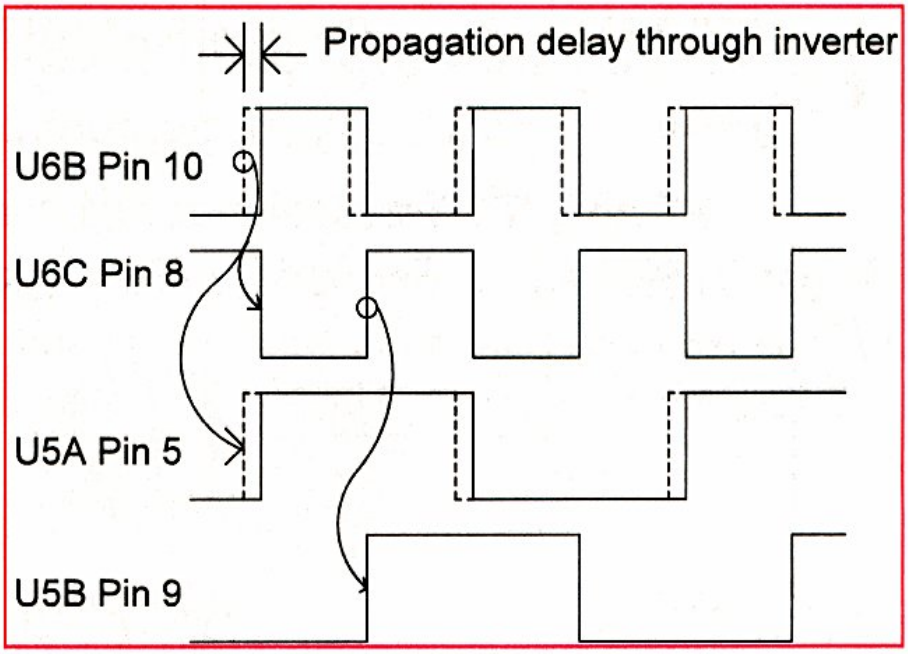


Figure 8: Carrier quadrature phase generator timing diagram.

Where the Yint equals the point where the ellipse crosses (intercepts) the vertical axis and the Ymax equals the highest (maximum) vertical point of the ellipse, theta (θ) is the phase angle between the mixer outputs, and it should be very close to ninety degrees for best sideband rejection. See Orr[3] for more details about phase measurements using this technique.

Lissajou figures obtained by connecting the I & Q channels to the horizontal and vertical inputs of an oscilloscope are shown in Fig 12.The maximum and intercept values can be easily measured

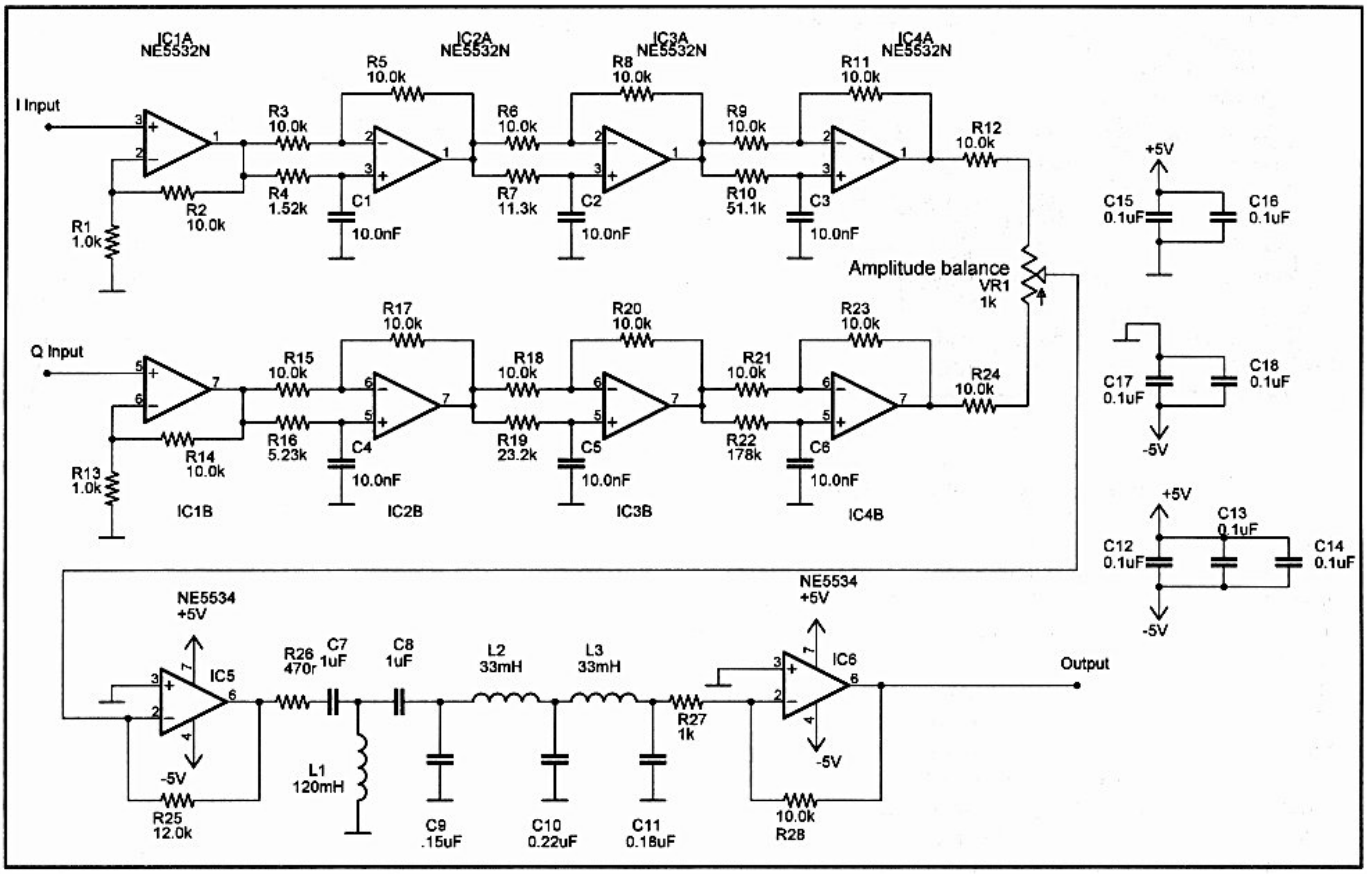


Figure 9: Schematic diagram of the phasing and filter board.

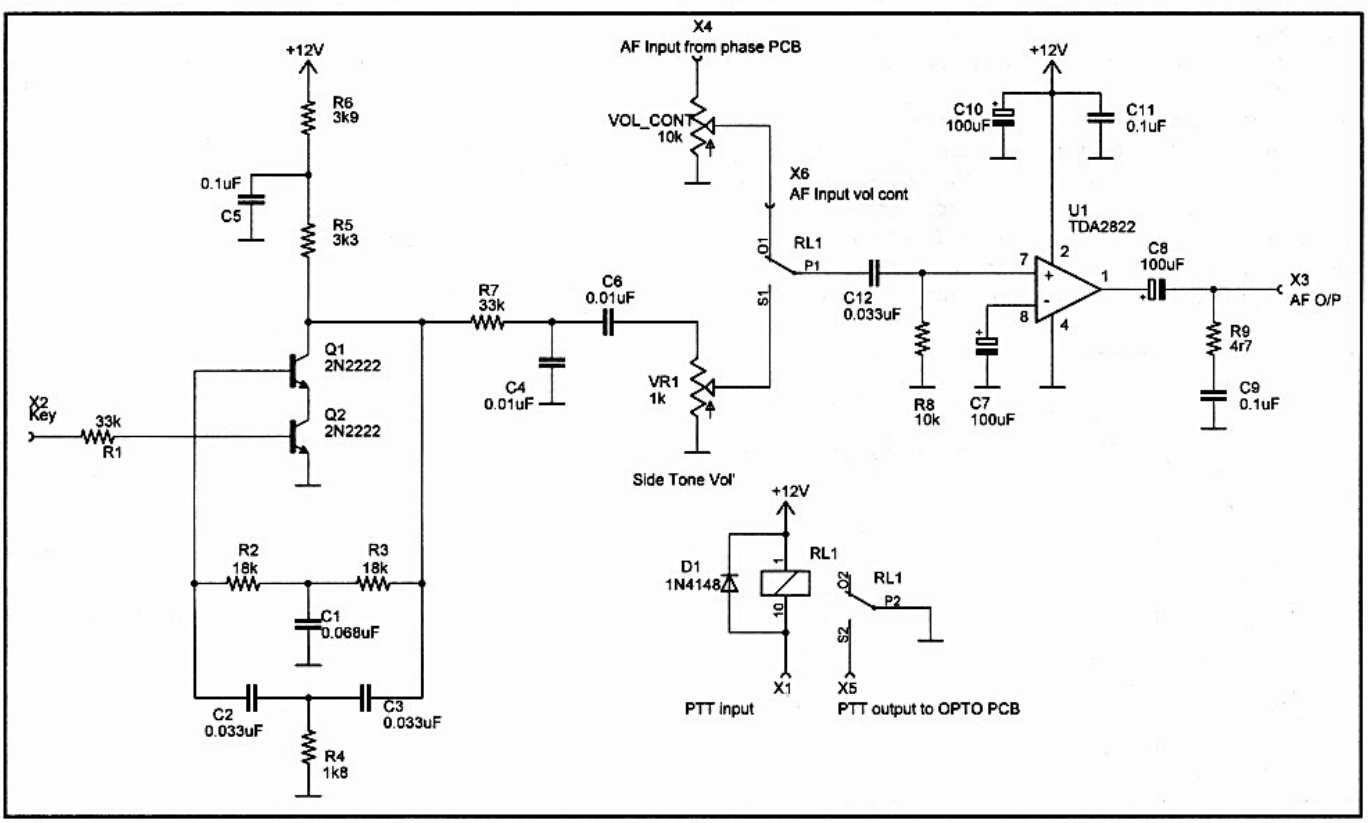


Figure 10: The audio amplifier and side tone generator schematic.

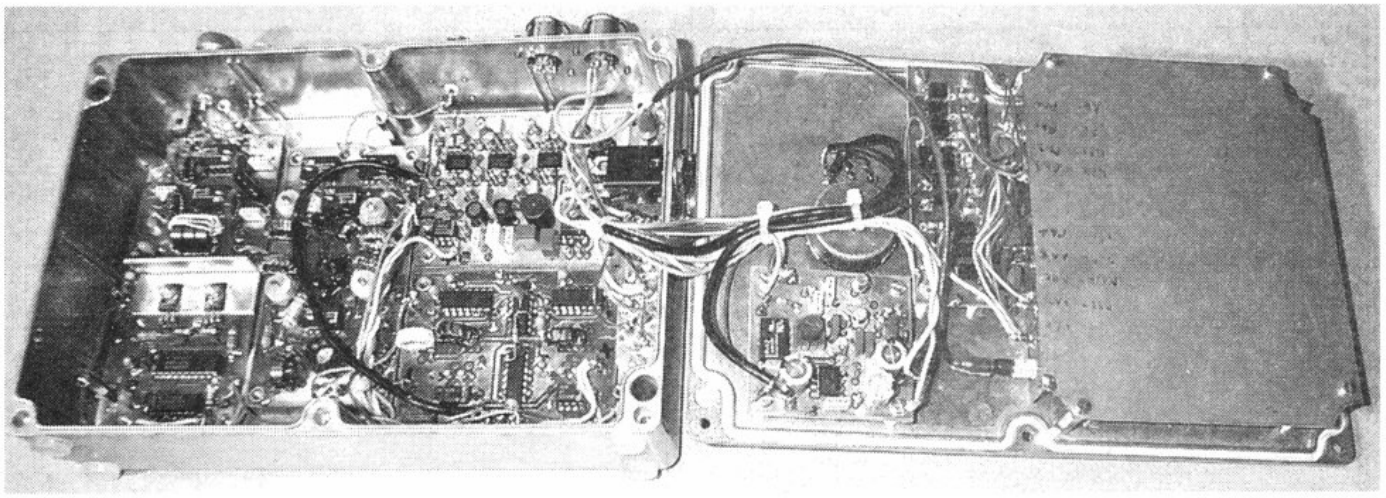


Figure 11: An internal view of the transceiver showing the placement of the various modules.

from the oscilloscope graticule.

Similarly, the performance of the audio phase shift network can be checked by connecting the I and Q inputs together and feeding an audio signal in, while observing the outputs of IC4 (pins 1 & 7). A circle should be seen on the oscilloscope if the network is working correctly. If an accurate circle is not seen, it indicates that the components in the phase shift network are not closely matched and they should be checked and replaced.

The receiver is a joy to use and it is very sensitive. It has low noise and the audio quality is superb. It appears to have an excellent capacity to handle strong signals and shows no tendency to overload even without any form of automatic gain control. Image rejection is excellent, this is easily tested by tuning a signal through 'zero beat' and hearing it disappear into the noise. Due to the excellent frequency stability and resolution provided by the DDS, it is possible to receive AM signals without the annoying beat note.

Transmit quality is good and no problems have been noted during use. Due to the use of DDS technology, frequency stability is as good as a crystal, with the added advantage of being able to accurately set receive and transmit frequencies. One of the idiosyncrasies of direct conversion receivers is that the receiver local oscillator frequency needs to be offset from the incoming signal; otherwise no beat note can be heard. In this design, the user has the option of setting a positive or negative receive offset that is added to the frequency displayed on the LCD. Thus, if the unit is set to 3500 kHz, and the offset is positive 500 Hz, the receiver local oscillator is set to 3500.5 kHz and a 500 Hz tone will be heard when a signal is present on 3500 kHz. There are no restrictions on the receiver offset frequency so it is possible to transmit on 3500 kHz and receive on 1850 kHz by setting the receive offset to negative 1649.5 kHz. When a signal is present on 1850 kHz, a 500 Hz tone will be heard in the receiver. Thus, split frequency operation is possible by setting the offset frequency to the desired value.

I'm happy to provide the software for the Atmel controller to interested readers, please write to the above address. None of the components used in the design should be difficult to obtain. The Amidon toroidal cores were purchased from RJ & US Imports[4], and the DDS chip and 30 MHz oscillator were purchased from Mini-Kits[5]. The rest of the components were obtained from Jaycar, Farnell and DSE.

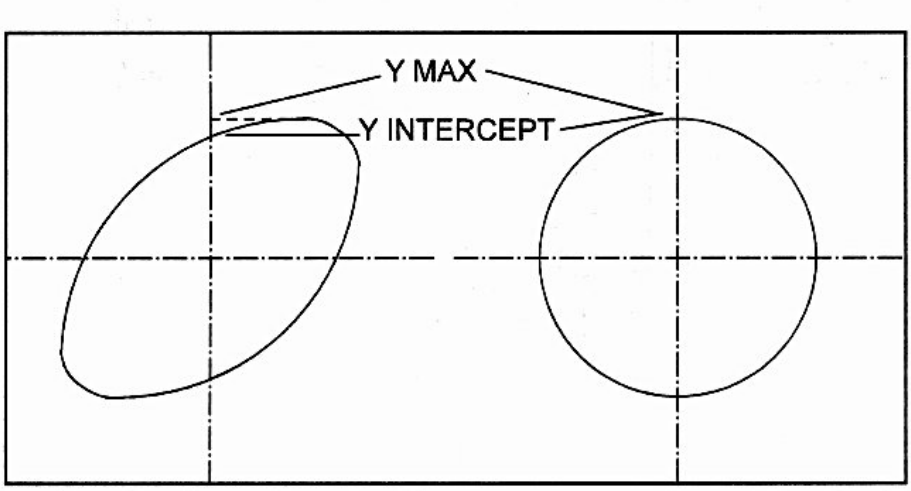


Figure 12: Lissajou figures obtained by connecting the I & Q channels to the horizontal and vertical inputs of an oscilloscope.

References and suppliers

1. Hawker, P, Technical Topics Scrapbook 1990 to 1994. RSGB, 1998. P230
2. Hayward, Campbell and Larkin, Experimental Methods in RF design, ARRL, 2003. In particular, Ch 9, which deals with the theory and design of phasing systems for image rejection systems.
3. Orr, W, Radio Handbook, 21st edition, Editors and Engineers. 1978
4. RJ & US Imports, PO Box 431, Kiama, NSW, 2533
5. Mini-Kits, PO Box 368 Enfield Plaza, SA, 5085

ar

Remembrance Day

A broadcast message

from

His Excellency Major General Michael Jeffery, AC CVO MC (Retd)

Governor-General of the Commonwealth of Australia

to

The Wireless Institute of Australia

Greetings to all the radio operators of Australia, wherever you may be, within, or beyond the shores of our great nation. We are tuned in today to celebrate the 60th Anniversary of the end of the War in the Pacific.

It is a privilege to be invited to declare open the annual Remembrance Day Contest, which honours service men and women who gave their lives in the defence of freedom.

Australia has always been able to rely upon the service given so freely by its amateur radio operators. Even in the darkest days of World War Two, radio operators who had enlisted in our armed forces, helped relay vital news from battle fronts to their commanders, greatly assisting strategic co-ordination.

Australian radio operators gained a reputation rivalling the very best. Men and women, whether they were telegraphists or coast-watchers, provided links which could quite literally be described as life-lines. Coast-watchers, occasionally in full view of the enemy and at great personal risk, reported invaluable detail of enemy activity. At times they were so close their transmissions were quickly detected.

The same skill and perseverance requirements apply today. Effective communication in every defence area is vital, whether via a crisp satellite link or a crackling high frequency radio.

And surely those coast-watchers of yester-year would marvel at today's modern technology, including satellite, digital, burst transmission and automatic encryption and decryption capabilities.

This year marks the 60th anniversary since the end of the war in Europe and the Pacific. You are about to hear a roll call of the Australian radio amateurs who gave their lives in the defence of this country. To those individuals who put duty to their country first, we owe our deepest thanks.

It is now with considerable pleasure that I declare the Remembrance Day Contest for 2005 open. Good luck to you all, and good DX.

RD reminiscing

Joy Stevens

"It is my sad duty to inform you that Australia is at war with Germany....."

September, 1939. My father was in his chair beside the open fire; my Mother on the other side; my immediately older sister sitting with her boy friend, and I on the floor leaning against my Mother's chair. My parents' reaction was very solemn; but for me, having just turned 16, it was: 'Oh well, it's on the other side of the world. We'll be OK.'

And so for a few months it was. Then suddenly one of our cousins joined up and went away with the 6th Divvey. Gradually various tradesmen came knocking on the back door to say goodbye to Mother. My second eldest sister's husband, who was in peacetime militia, was called up and went into camp, so all of a sudden it was not OK.

In September 1940 I obtained a position with the Department of the Army and was based with the Australian Army Canteens Service, Queen Street, Melbourne. The Women's Services had not been instigated at this stage.

As the War increased in intensity, so did the action in Queen Street. AACS serviced canteens any where Australian troops were camped – here and overseas. It was not unusual to work overtime a couple of nights a week and one night I went with two other staff members for a tea break (we were given 2/6 pence tea money). The waitress who served us was in floods of tears and when we asked what the trouble was, she pulled a very crumpled telegram from her apron pocket and gave it to us to read. Her husband had been "killed in action". We said why don't you go home and she just said through her tears: "What for?"

By January 1943 I decided to join the AWAS, did my rookies school, came back to Queen Street, received my first stripe one day, next week two stripes and was made Sergeant in March, 1944. January, 1945, I volunteered to go to Lae, New Guinea. General Blamey had agreed to allow a small contingent of 344 AWAS and I was accepted due to my extensive time with AACS.

We did an extensive training programme in Queensland before embarking on the 'Duntroon' on 2nd May, 1945. I had never set foot on any kind of a boat before and although there was a mine sweeper ahead and we had an escort convoy, I felt sure the ship was going to sink!

Up to this time the Allies were winning the war in Europe and as it happened, VE Day, 3rd May, 1945, we were on board the 'Duntroon'.

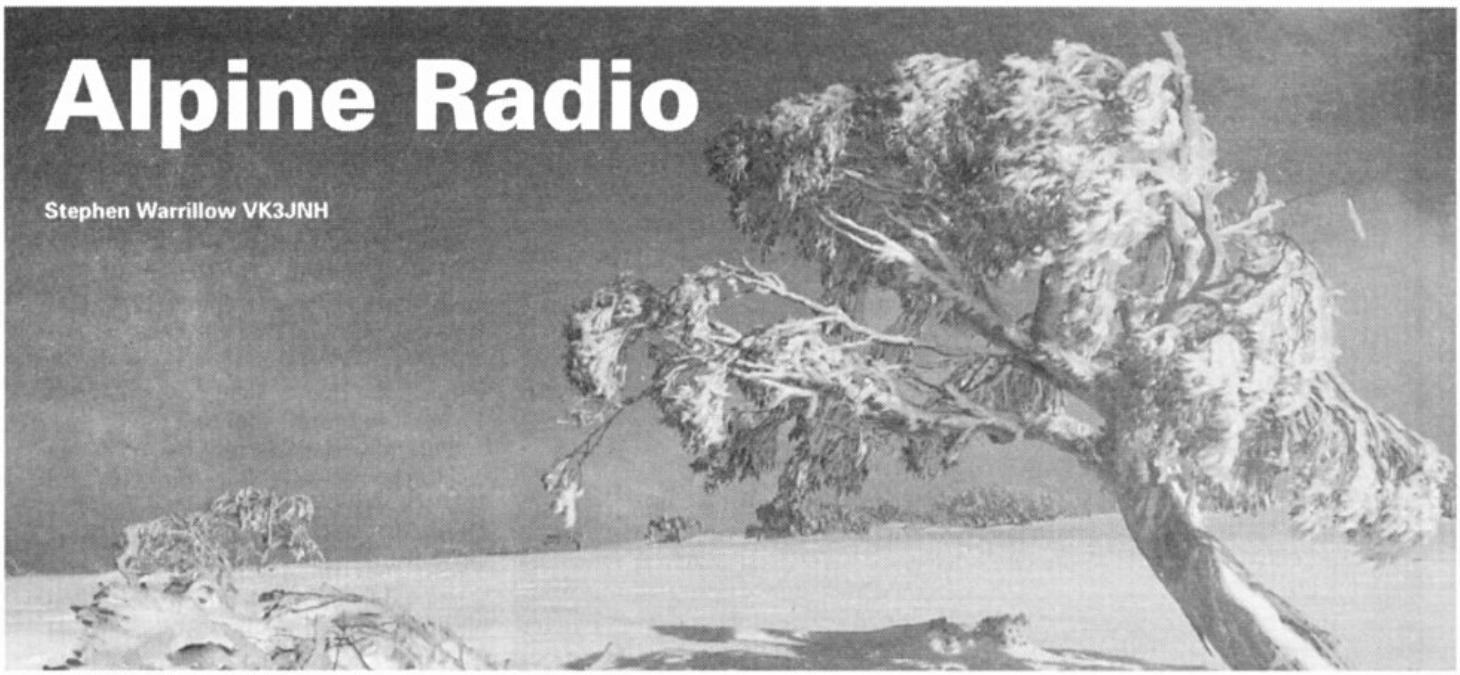
What a different world I was about to enter! Swaying coconut palms – all shot to ribbons. Hundreds of thousands of American and Australian troops; guns; armoured guards; atabrine (or atabran), an anti-malaria drug; rules and regulations; work and play. My life in New Guinea was exciting: the absolute magnificence of the jungle; humidity and exploration of the countryside with groups and armed guards.

One thing which stands out is the New Guinea people, for those whom I came in contact with were very gentle people. I loved them!

continued on page 20

Alpine Radio

Stephen Warrillow VK3JNH

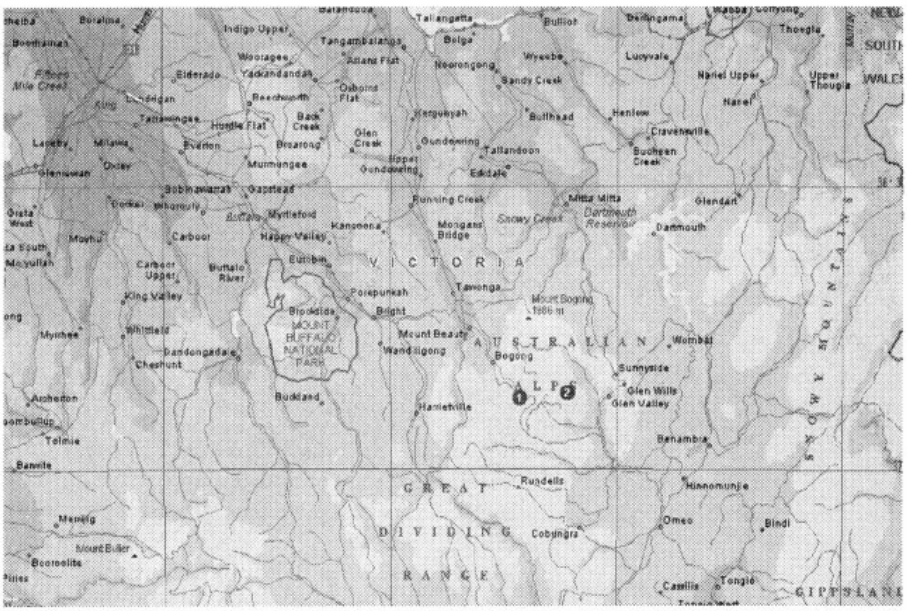


The Bogong High Plains region in the Victorian High Country is a picturesque place no matter what time of year. Every winter, this place is transformed by a blanket of deep snow and it is truly beautiful. During this cold season, Victoria's alpine resorts are packed with downhill skiers who come to enjoy the swift descent down groomed mountainside runs. Many are probably not aware of those heading off 'back country', away from even the groomed cross-country trails close to the resorts, to where one can enjoy the unique experience of skiing on virgin powder snow down unmarked slopes and gullies.

Cross-country skiing off the trails requires preparation, basic fitness and a sense of adventure. We have enjoyed exploring the Bogong High Plains for many years now with annual trips in summer and winter whenever we are able. Amateur radio has, on each occasion, brought an added dimension to these adventures. From providing essential means of communication between party members on the trip and family at home, to acting as a back up means of emergency communication in this isolated region, portable and hand-held gear has played an important role on each trip. Extended back-country cross-country skiing trips necessitate each member of the party to be self-reliant. All food, clothing and equipment must be carried in a rucksack while skiing through what can be fairly rugged terrain. Therefore only the essentials can be carried and all equipment must be light and robust.

As with previous years, we chose to head to the high plains in late July 2004 in order to maximise the chances of good snow conditions. Consistent with recent years, we were fortunate enough to have excellent snow with a good base of over 150 centimetres measured at Falls Creek. Knowing what not to pack is just as important as knowing what is essential to take on these trips. Keeping the previous year's list is an important short cut that helps decide how to prioritise what should go into the rucksack. Vital equipment includes rucksack, sleeping bag, first aid kit, snow clothing, sunglasses, skis, stocks and boots. Navigational aids such as detailed maps, GPS and compass are also necessary and we carried an

The trip in



emergency satellite beacon with the group in the event of real trouble.

Catering for an extended trip is always a challenge; it is important that the menu be light, non-perishable, high in energy and palatable. Sufficient supplies were carried so that no one would starve if an unplanned additional day or two was spent out due to unfavourable weather.

During the warmer summer months, tent based camping in the alpine regions of Australia is very pleasant, but come wintertime, only the very well prepared and hardy take on extended periods of snow camping. In winter, we favour staying in alpine huts, many of which were built in the time that mountain cattlemen used to drive their stock up to graze on the summer grass each year.

While such huts are often very basic in construction, many have tremendous historical significance and are a very welcome warm shelter during the snow season. Unfortunately, several huts have been destroyed by bushfire over the last few years and it is important to check with locals that the specific hut one intends to stay in still stands prior to heading off.

Having selected a time to go and packed food, clothing and ski gear the next priority was what amateur radio equipment could be taken. Remember that every item on the trip had to be carried in a rucksack while skiing up hill and down dale.

With three licensed amateurs in the group, it was possible to assemble a fair amount of compact and reliable gear. We had always taken VHF/UHF FM handhelds and a variety of antennas in the past and enjoyed working through various distant repeaters accessible thanks to the remarkable line of sight paths that can be achieved from mountain tops.

This, however, was the year to attempt some HF DX work from the Alps and we were determined to find a way. The ability of manufacturers to miniaturise radio gear in recent years is quite remarkable and there now exist several multiband, multimode QRP commercial rigs that are small and light enough to carry cross-country.

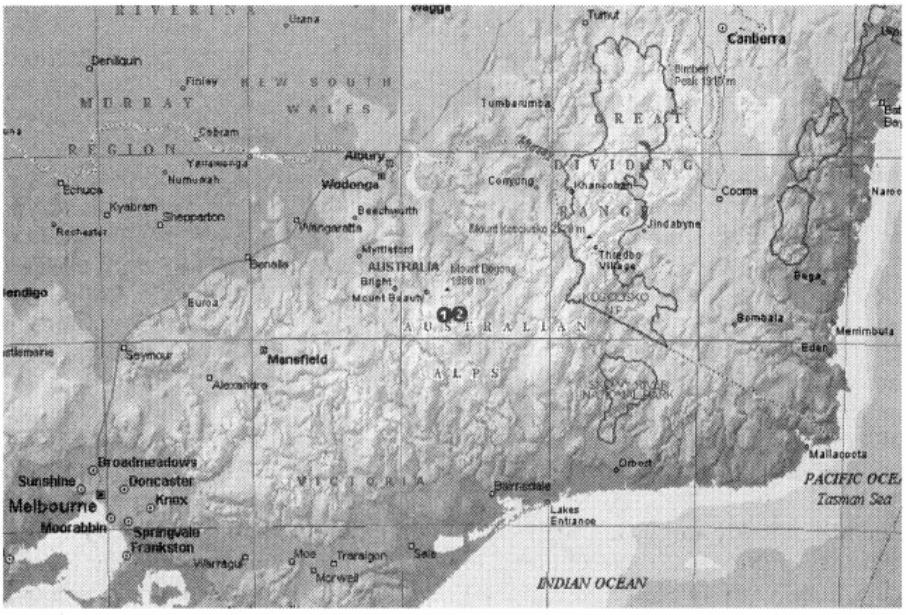
Powering such devices however, still presents a significant challenge. After some deliberation, it was decided to take a Yaesu FT-817 with an LDG Z11 auto tuner, which would work into a home brew multiband dipole with a QRP specific 4:1 balun. Power for this rig would be derived from 12 V sealed lead acid batteries (4.2 and 2.0 Ah) which could be trickle charged from an 'ICP BatteryFlex' 10 watt solar panel.

For communications between members of the group while out skiing and to work repeaters from hilltops, several VX-7Rs were also taken as was a variety of multiband whip antennas. The waterproof and rugged design of these little hand-held radios are very desirable characteristics when in the snow.

The total weight of the combined HF radio equipment and power system was approximately 4 kg, which fitted in well with the twenty-something kilograms of each rucksack when fully packed.

Due to work commitments not all members of the group were able to head to the hills on the same day. Most headed up to Fall's Creek on the weekend and then had a difficult ski in to the hut due to challenging weather conditions.

The remainder of the party joined up with the main group on Monday and managed to meet up on the trail in to the hut using two metres to coordinate a meeting place and check progress. Snow and weather conditions had substantially improved by this stage and the forecast was favourable for the next day or so.



Upon arriving at the hut all the most important preparations had been undertaken; a warm fire was burning, the kettle was on, the dipole had been strung between a couple of nearby snow gums with the solar panels sitting on a bank of snow, angled to catch maximal sunlight.

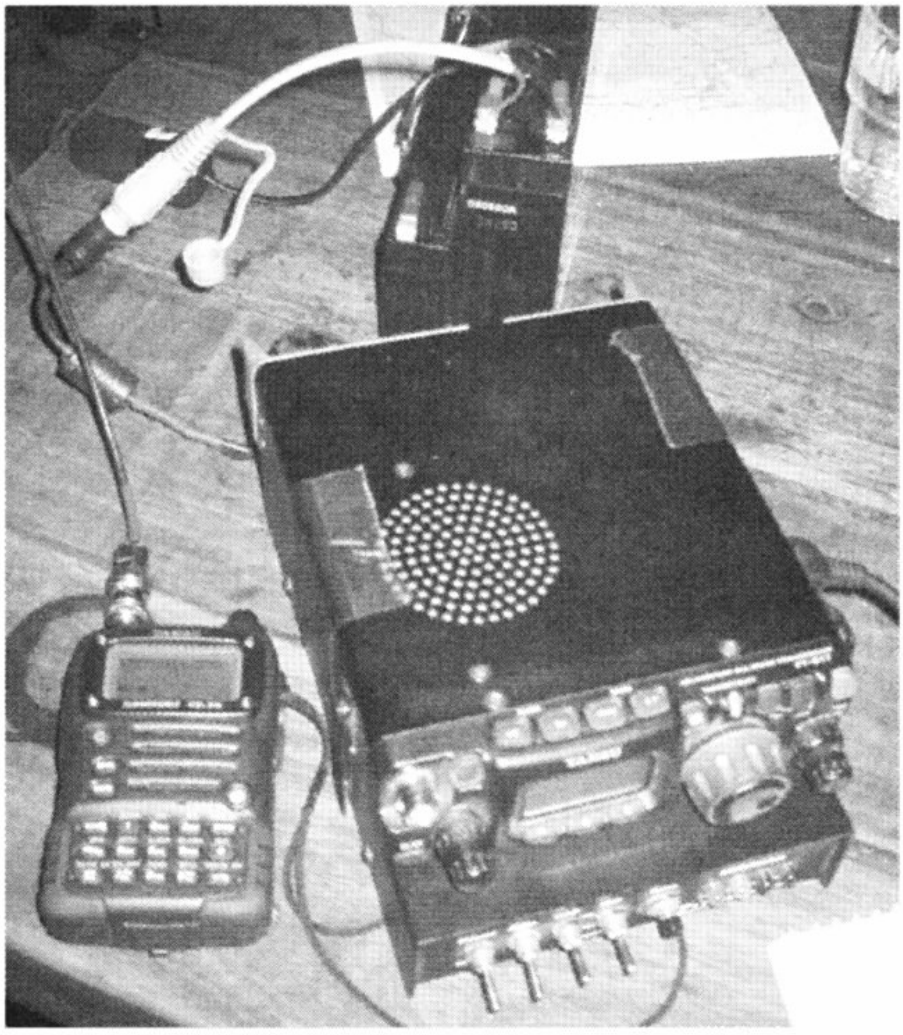
The following day was fantastic in every respect. There had been a light snowfall overnight and the day proved to be clear and bright, the main hazard being sunburn! After a quick hot breakfast, we set out on a tour of some of the more distant huts. With the combination of map, compass and GPS we were able to detour from the marked tracks and discover some beautiful snow gum forests, a delightful waterfall cascading down a steep gully and a broad sweeping snow plain, which fell into a small ravine.

The skiing was varied, some sections having steep climbs and descents, but for the most part it consisted of gentle inclines through snow gum forest or across snow meadows. One of the greatest joys of this type of skiing is the isolation and absolute silence. Apart from the swishing sound of the skis on fresh powder snow, the silence would remain unbroken.

Upon arriving at familiar huts, it is always interesting to see their condition and to thumb through the log to see how many visitors they have had over the previous season. Most visitors take the code of caring for these fragile structures and surrounding environment seriously and we were pleased to see the huts we visited were in good condition.

By late afternoon it was time to head back to camp and see if we could work some HF.

The solar panels had been carefully arranged to ensure maximal sun exposure through the glorious sunny day. Although the antenna was not particularly high, the complete absence of QRM meant that even weak HF signals could be readily heard. Several good contacts were made, mainly on 40 metres, including several members of the North East Radio Group in Melbourne. Throughout the afternoon, we enjoyed tuning across the HF bands and working QRP. Forty metres was certainly the most rewarding band with numerous contacts including a few US stations. Those non-amateurs in the group were certainly intrigued and amused by our exploits as well as being impressed that such low power gear and a piece of wire strung between two snow gums could work across such vast distances. Of particular interest to them was the use of abbreviations and Q codes, several of which they become very familiar with over the course of the trip.



The rig

We would like to thank those courteous and patient operators who took the time to work us and hear a little about our solar powered portable station in the snow. If there were any complaints, it would be the tendency by a small number of operators to acknowledge the presence of a portable QRP station, but then make no apparent effort to make space in a group to work us.

Changes in weather can be rapid in the high country and by late afternoon, heavy snow was falling and continued to do so for the next thirty-six hours. While this prevented extensive excursions from the hut, the most adventurous of the group made several forays into the snow plains and slopes that lie immediately above the hut to practice various skiing and snow boarding skills.

The heavy snow limited visibility to less than fifty metres and gave the hut an appearance worthy of a European Christmas card.

Later, it was clear that no respite in the weather was imminent, so several members of the group decided to ski to the summit of Mt. Nelse (which is nearly the third highest point in the state) despite the bad weather. From there it is possible to hit the Wagga IRLP enabled two metre repeater in NSW.

On the previous year's trip several contacts were made between VK3JNH on Mt. Nelse and VK3JPA operating as M0DCN in the UK via IRLP from this point using a hand-held. After a brief period at the summit, conditions became pretty difficult, but using the hand-helds on two metres, we were able to keep track of progress and ensure safety throughout the climb up the mountain

and the long ski back to the warm shelter of the hut.

After another session of working HF, another pleasant evening was enjoyed sipping port by the fire and recalling the great times of previous trips. By this stage the snow was over 180 centimetres deep in places and was absolutely ideal for cross-country skiing.

Unfortunately all good things must come to an end and by the next morning it was time for at least some of the group to head back to Melbourne for work commitments the next day. Several other members of the party benefited from another day of tripping about in the snow and had a few sunny breaks through what had been otherwise uninterrupted snow. After a total of five nights away (and with enough food to last at least another three!) the remainder of the group took down the antenna and packed away the radio. We had been lucky overall to have had extremely good snow and at least two days with good weather. Once again, amateur radio had been an integral part of the trip and for the first time we'd had some fun on HF. Already, we are considering improvements and refinements for the gear and looking forward to another trip to the snowy peaks of Victoria's Bogong High Plains next year.....

FT-817 and tuner

On the trip were:

Stephen Warrillow VK3JNH (author)

Gerard Warrillow VK3JPA (photographer)

Matt VK3HFI, Brendan M, Matt W, Steve V and Lindsay

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The secret radio in concentration camp 1942–1945

Arn van der Harst, VK5XV.

Although a fair amount of information is available regarding the P.O.Ws in the military concentration camps very little is known of the civilian P.O.W. concentration camps in South East Asia.

I was born and lived with my family for 14 years in Bandung (Indonesia) which was then part of the Dutch East Indies. My father was Chief Engineer of the Water and Electricity Supply in West Java. When the 2nd World War broke out it took the Japanese little time to conquer the Dutch East Indies. In 1942 all Dutch civilians were put in concentration camps, men separate from women and children. When boys reached the age of 14 years they were transferred to the men's camp and put in separate barracks on the same site as the men's barracks. During the last 6 months of the war the boys were isolated from the men. My total time in the concentration camp was 3 years, 2 years in the Tjihapit women's camp and 1 year in the old Dutch 15th Battalion men's camp. This story deals with the 15th Battalion concentration camp, which was formerly a military camp but during the war became a civilian concentration camp. Towards the later part of the war it had a total of 12000 civilian P.O.Ws.

The "Secret Radio".

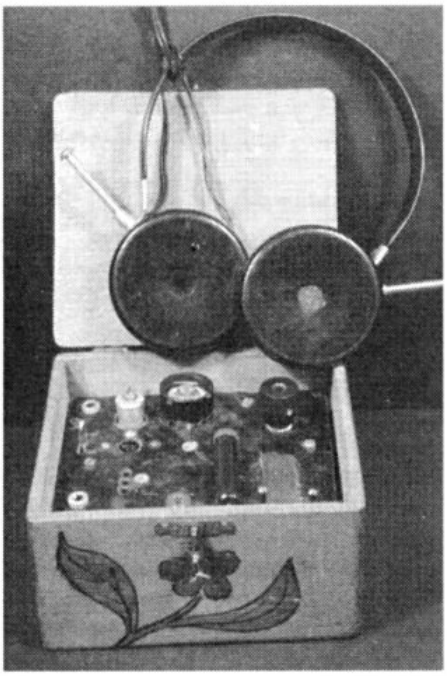
When I was all of 14 years old I was transferred to the 15th Battalion camp, I discovered to my surprise that my father was in that camp as well. With a bit of negotiating I was allowed to sleep next to my father instead of having to go to the boys camp because of his bad physical condition. After a while I was aware that there was a "Secret Radio" and my father knew about it, but he did not want to talk about it. Only a very few people knew about the birth of the "Secret Radio" and its use. At the time of the 15th Battalion camp becoming a civil P.O.W. camp a small workshop was installed under the direction of Mr. G.J. Vos, a brilliant man with a brilliant team, that could maintain, build and repair anything. The small workshop grew to a much bigger workshop, all sorts of things were manufactured, legal and illegal.

One day a Japanese guard entered the workshop with a radio that did not work anymore. He asked if the workshop could fix it for him. The answer was obvious, in no way could that radio be fixed anymore and, as a favour for him, they would throw the thing in the rubbish bin. Understanding the severity of that statement he quietly left. It took Mr. Vos and his expert team of Radio Engineers little time to work out the beginnings of a "Secret Radio".

Looking at the photographs will explain how it was done. The Radio Team designed a simple one valve receiver and a transmitter. It was built in metal boxes. Those metal boxes in turn were put in modified water flasks as used by the Japanese soldiers in the field. The water flasks were precisely copied and made by the engineering team of the workshop. Even the colour of the cloth cover of the flasks was very precisely matched. Apart from the few people who operated the gear nobody knew where transmitter and receiver were situated.

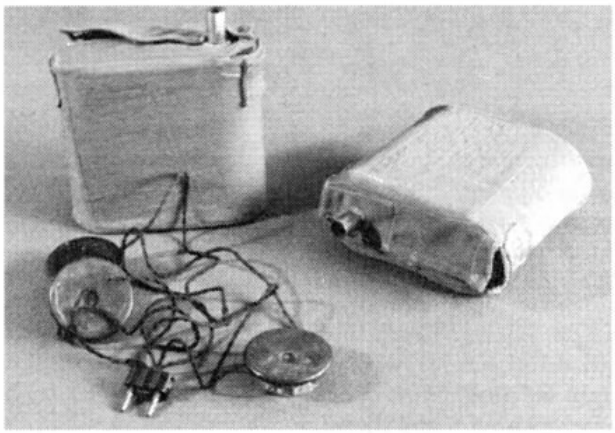
The receiver and transmitter worked perfectly right up to the end of the war and they were never discovered by the Japanese guards. It is interesting to note that, even with its extreme low power, contacts were made with radio amateurs in North Australia.

It is thanks to this radio that a select group was given the news from day to day and they then secretly whispered it to the rest of the prisoners. We knew



instantly of progress during the war, the dropping of the atom bomb on Hiroshima and finally the capitulation of Japan. Officially, nothing was said to the prisoners of the capitulation by the Japanese guards until a month later.

Mr. G.J. Vos survived the war. He brought back to the Netherlands the concentration camp "Secret Radio" he was so proud of. Many years ago he lent the "Secret Radio" to a firm for an exhibition. After many requests to return the radio, the firm refused to give it back. It was thanks to the stubborn nature of Mr. G. Schouten, close friend of Mr. G.J. Vos, that eventually the radio was returned to him while he was in hospital. Mr. Vos died a few days later. The "Secret Radio" is now with Mr. Schouten. It is thanks to him that I received the information and photographs I still needed.



I would also like to thank Mr. Jacque Slegtenhorst who helped me so much in my detective work. As for the Japanese guard, I hope he never reads this story if still alive!

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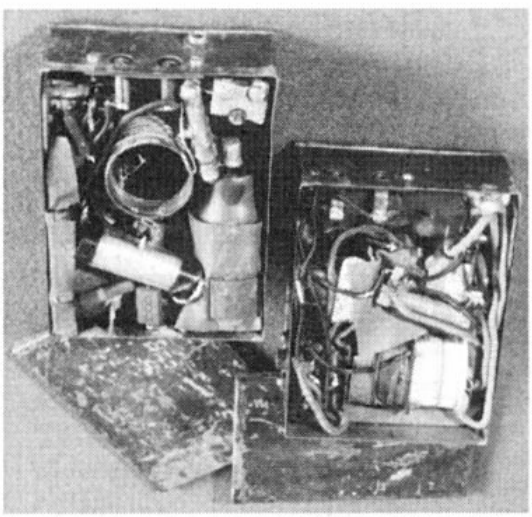

The secret camp radio various views.

WIA Comment

continued from page 3

assessors and to become amateurs. After all that's what it's really all about.

But how is all really going to work? What happens to the existing Group Leaders and Invigilators? What happens to the current system where the papers are marked separately from the examination venue?

With our current system, a club may have nominated one or more Invigilators, one of whom is the WIA's primary contact as a Group Leader. The Group seeks examination material from the WIA Exam Service for named candidates at a forthcoming examination. The papers are returned to the WIA Exam Service for marking and the WIA Exam Service advises the candidates by mail of their result.

We hope that many of the current Invigilators will qualify as WIA Assessors.

But we also see these teams from the clubs assisting the Assessors in arranging Foundation courses, and examination "events" as they are called, helping conduct the examinations as they do today, which is why the Assessor Instructions I referred to above use so far as practicable the same instructions for the conduct of an amateur radio examination assessment by a WIA Assessor as are used for the present examinations.

Sure, as I say above, the practical assessment requires the assistance of a WIA Assessor, but for the Standard and Advanced certificates, the current system can continue, at least until all the clubs have at least one WIA Assessor.

That is why, for these first assessor-training courses, we have sought to ensure that the candidates are all supported by their clubs.

Once again, the WIA recognises the essential role of the clubs in making this new world of amateur radio a reality.

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Antenna booster for hand-held scanners

Ron Holmes VK5VH

A need met

When I bought my VR-500 Yaesu 'Communications Receiver' Hand-held I was amazed at what this little device could do. General coverage reception from 100 kHz to 1300MHz in all modes, 1000 memories etc., etc. Who needs the internet for wasting time with this little instrument in your pocket?

The only point at which I was a trifle disappointed was that on the H.F. Amateur bands it was somewhat deaf. There were no problems with the powerful international broadcast stations, but DX on 20 metres was a bit thin. In fact there was not a lot readable on any of the H.F. bands. Of course, on an antenna 7 ½ inches long (19cm) it is asking a lot of any receiver to pick up low power twenty, forty and eighty metre transmissions, let alone 160 metres.

Remembering the remarkable success of my "Shack in a Briefcase" tunable mini-antenna (See A.R. July 2002) I wondered if a similar idea could be used in an even smaller system useable with a hand-held? The answer is Yes. I have designed an antenna which, with one 12 position switch, plus a miniature tuning capacitor intended for cheap transistor receivers, can tune everything from 1.8 MHz to 50 MHz with an increase in received power of at least 5 S points over the antenna provided.

In other words a signal which cannot be heard on the supplied antenna will be quite readable using the booster. A signal reading S1 or 2 on the supplied antenna will rise to 6 or 7 on the booster, sometimes more. Using the rough assessment of 1 S point equalling about 6 db this equates with a gain of around 30 db by the use of the tuned antenna booster.

This addition weighs practically nothing and has a metal handle attached. With the handheld clipped to the front of the booster box you can use it as conveniently as the hand-held alone. The handle is earthed so that in use you become the counterpoise.

Recently I used the rig in what I would call a 'worst case scenario'. Due to illness I was not able to get to the shack to join my regular Sunday night 80 metre net. I tuned up the hand-held on the frequency and listened in the lounge room. The normal S8 background noise was there and I doubted if I would read the signals through it. However, by using good quality earphones I was able to turn the gain back and made 100% copy on every net member from Noarlunga, 30 K south of my QTH, to Mintaro, 130 K north. On the supplied antenna no signals could be heard.

Normally, on 40 metres, I can read interstate skeds from VK4 to VK7. On 20 metres DX, any signal over S5 on my main rig, using a quarter wave vertical antenna, is audible on the hand-held. S9 signals come through at about S6. I have also found that HF broadcasting stations come up from S1 on the supplied antenna to S8 on mine. In short, 'the right parts make all the difference!'

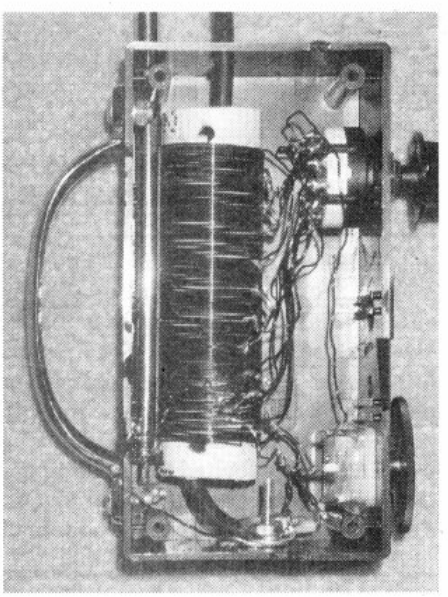


Photo 1. Close-up of the innards with the lid off. Perhaps it could have been tidier but I made a number of variations along the way before ending up with the final version. It did not seem worthwhile starting from scratch again. The tappings are arranged by making a slight kink in the wire while winding, or later, then scraping and tinning it. The longish bolt in the bottom is the earth point connected to the handle and other earthed parts of the circuit.

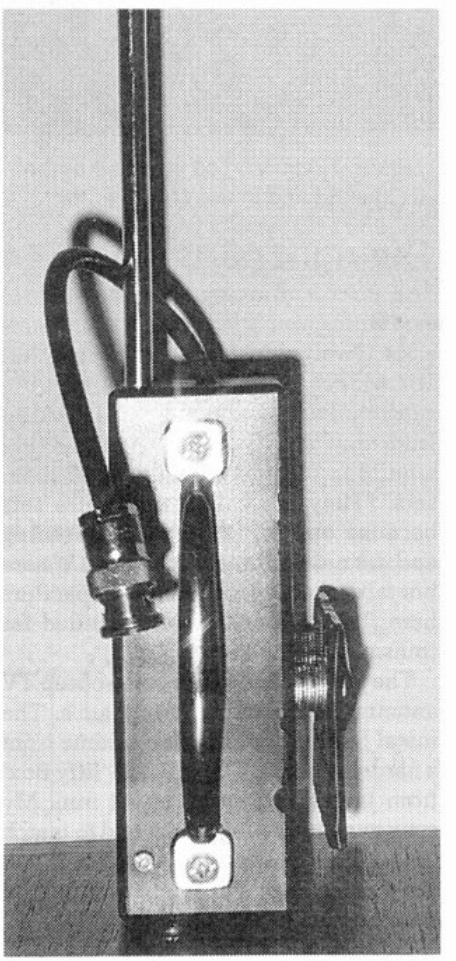


Photo 2. Side view showing positioning of handle, telescopic whip, connecting coax and the plate for the belt clip. The whip goes through a close-fitting hole in the back left corner of the case. The small bolt which secures it to the side of the case near the bottom is shown in this photo. The coax comes up through the inside of the coil former and out another close-fitting hole in the top of the case. See Photo 1.

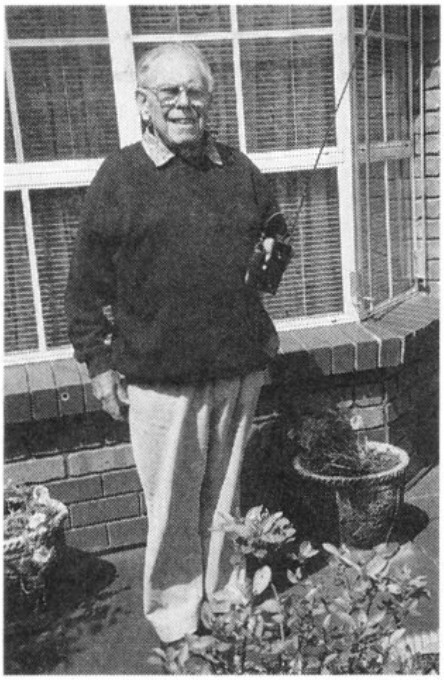
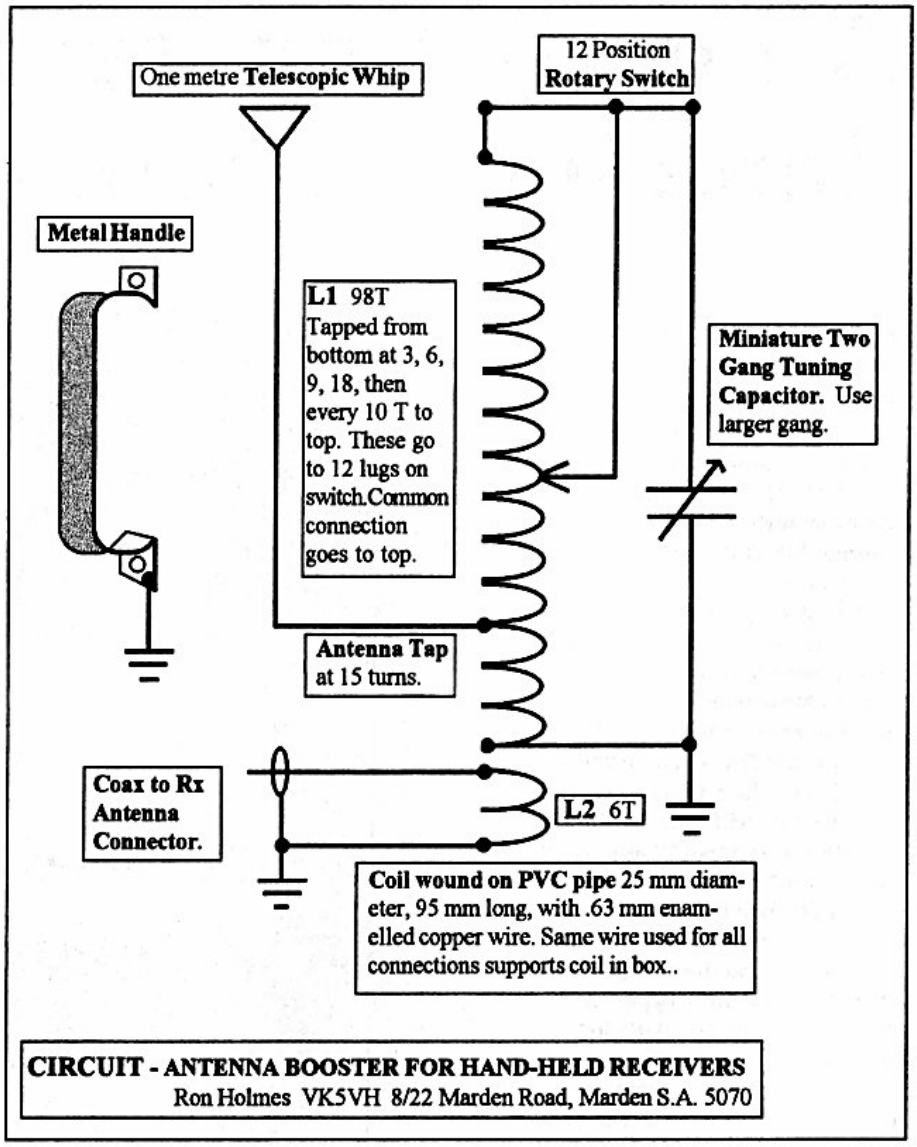


Photo 3. The VR-500 attached to the booster and in use by the author.



The right parts

The circuit drawing indicates nearly everything you will need. It won't cost a lot. Twelve position rotary switches are widely available. The small two-gang tuning capacitor is a bit hard to find new, but there are plenty lying around in cheapie miniature transistor sets. (They are called miniature sets because one minute you're listening and the next minute you're not.) We are not talking air-spaced tuning capacitors here. This antenna is not intended for transmission.

The telescopic whip is half a cheap TV antenna bought at Cunningham's. The metal handle, 110 mm long, came from a hardware store. The case is a 'Jiffy Box' from Jaycar 130 by 67 by 44 mm. My coax has a BNC plug on the end to match the base of the supplied antenna. If you are making it for a different scanner the appropriate plug will be necessary.

The circuit plus the photographs should make everything reasonably clear. In use, the VR-500 belt-clip slips firmly over a plate of wood, plastic or metal 2 or 3 mm thick. Mine is three-ply covered with black tape. It is 50 mm long by 70 mm wide, bolted to the lid of the case, with spacers holding it 10 mm out. The top is 70 mm up from the bottom of the case. This allows the whole set-up to stand on a flat surface if desired. Make sure it allows clearance to the bottom screws of the lid. Again, a different rig may need a different arrangement.

Incidentally, if you are using the rig with earphones you can stand it on a table and not need to touch the handle as a counterpoise. The phone cord does the trick.

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RD reminiscing *continued*

My Father died in September, 1940, my sister's boyfriend went to the Middle East with the 7th Divvey. He returned to Melbourne on 18th April, 1942, married one week later on 25th April and was posted to New Guinea. By the time I returned from there he was discharged and they had two children.

The wonderful thing to come out of this is the friendship, despite social background, distance, religion, anything! For example, recently I went up to Melbourne and met up with five other "New Guinea Girls" – we do this twice a year. I have a long list of Christmas cards all over Australia.

The news that peace was declared reached us during the morning of 15th August, 1945. We were given the half day off; a dance was held in the recreation hut, open to all and sundry. Then back to work next morning! Strangely, none of the wild celebrations occurred which were seen throughout Australia!

I can reflect on friendships and comradeship and the heartaches. War is a terrible thing, but so is the threat of invasion. Nevertheless, it showed that here was an opportunity for women to contribute in a meaningful way.

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An HF – 6 metre antenna diplexer

Keith Gooley VK5OQ

What is it

Basically it's a three port filter designed to allow a single transceiver to drive one of two antennas depending on the frequency.

Many late model HF ham transceivers include the 6 metre band and utilise the same RF coaxial connector for the full range of 160 m to 6 m. This is due to the capability these days to readily produce a 100 watt solid state PA covering the whole range.

However, most hams don't use the same antenna for HF as they do for 6 m. A three element tri-bander might be typical for the higher HF bands and a 4 or more element Yagi for 6 m. Alternatively a G5RV dipole might be used with an antenna tuner on HF and a vertical J-pole or quarter wave on 6 m. For portable field day operation I have used a 40 m half wave dipole for HF and a Moxon Rectangle for 6 m. Most readers will realise the inconvenience of having to unplug the HF antenna and plug in

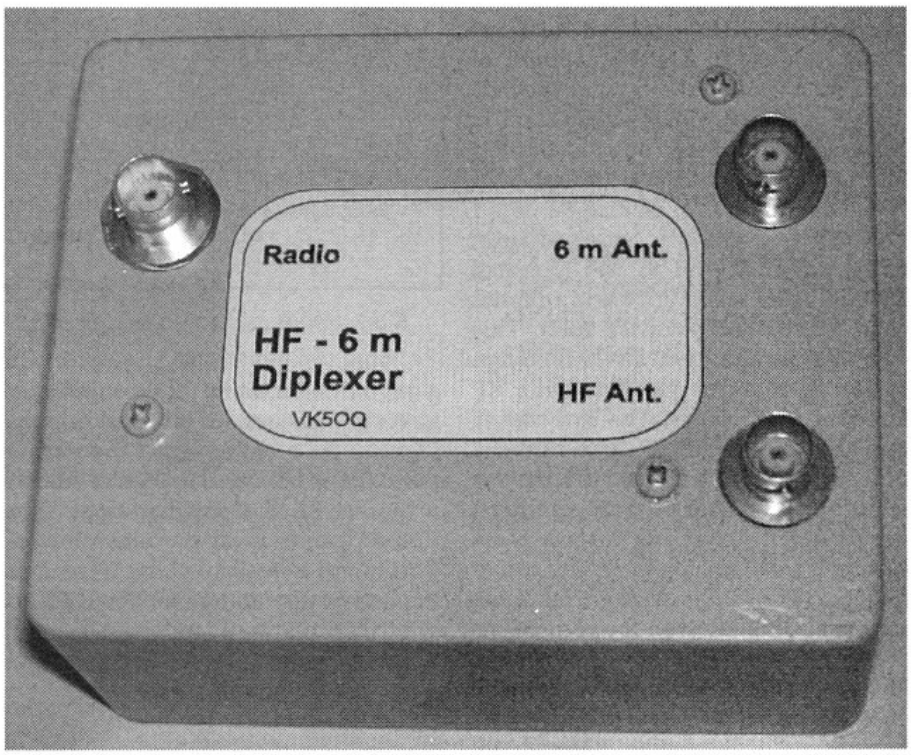

Photo 1. The HF – 6 m antenna diplexer front panel view.

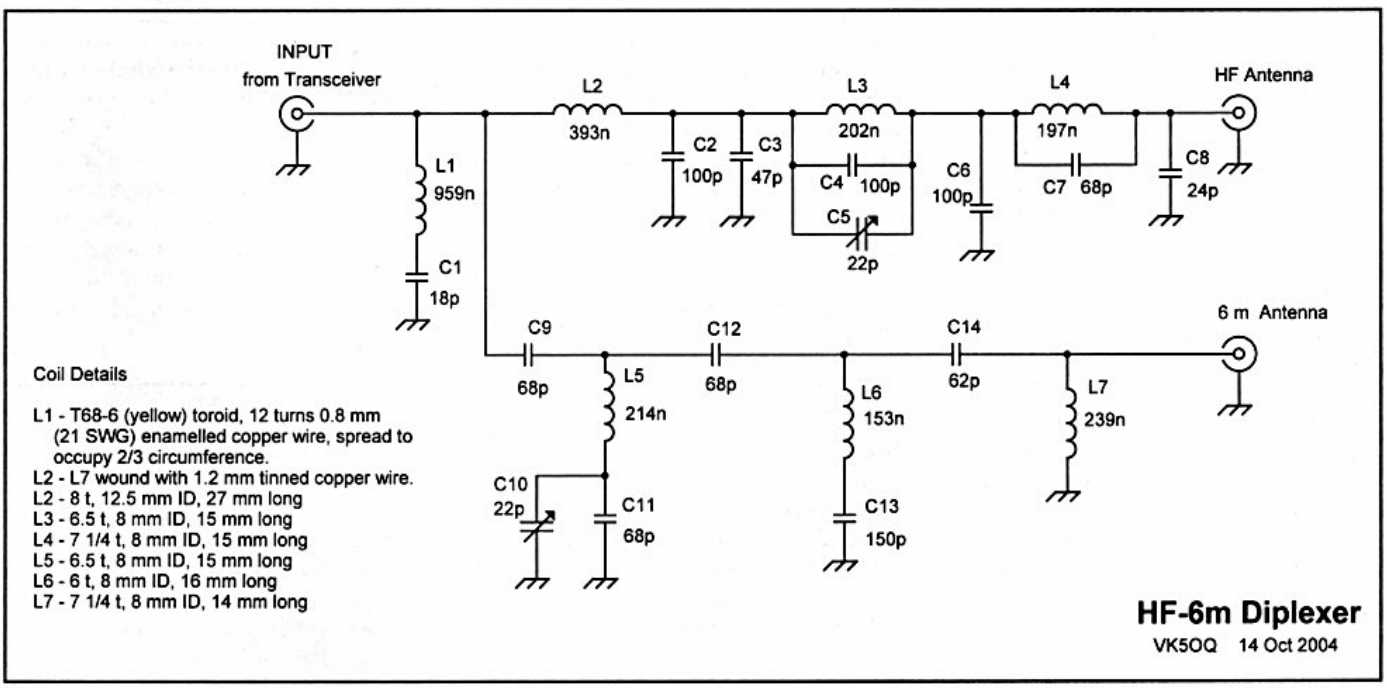

Fig 1 – Schematic of the diplexer.

the 6m one when wanting to change to 6 m operation. This diplexer gets around the problem and both antennas can be left connected to the transceiver with the diplexer directing the signal to the appropriate connector.

Circuit description

The diplexer consists of a low pass and a high pass filter with the inputs of each parallelled. This is possible without disrupting the passband response of either filter because the input impedance of each filter outside its passband is designed to be high, so that neither filter significantly affects the other in its passband.

The filters are 6th order elliptic and I am indebted to the Nuhertz Technologies website (www.nuhertz.com) for the design of the filter. This company has produced a very thorough suite of programs for designing RF filters of many types. The software is available free for download in a 30 day trial version. In addition Nuhertz has on its site a number of example filters, one of which suited this purpose quite closely. It was a 75 ohm filter with corner frequencies of 30 and 40 MHz. Some simple scaling allowed me to produce a design which does the job very well, having corner frequencies of 30 and 48 MHz and a 50 ohm characteristic impedance. To change the characteristic impedance from 75 to 50, just multiply the L's by 50/75 and the C's by 75/50. Then to move the upper corner from 40 to 48 MHz, the L's and C's in the high pass filter are multiplied by 40/48.

An extra series LC network (L1 and C1) was included in the original design across the input to improve the input SWR at the high end of the HF range and at 50 MHz.

Components

All the inductors except L1 are air wound and should be readily duplicated by constructors. The coil details should be followed as closely as possible. L2 was wound on a 12 mm drill and L3 to L7 were wound on a 7.5 mm drill. Wind the coil close-wound with adjacent turns touching to start with, and then pull the turns out to reach the specified coil length when the turns spring back. I then put two runs of hot-melt glue along each coil to hold the turns in place. The glue had no measurable effect on the Q.

Design values for the inductances are given on the circuit for those constructors having a means of measuring the inductance. L1 has a larger inductance than the others and is conveniently wound on an iron powder toroid. Type T68-6, painted yellow was chosen. This toroid is available from R J and US Imports or distributors for about $2.40. Wind the turns evenly and space them out to occupy about 2/3 of the circumference of the toroid. Squeezing them in closer or spacing them out more will change the inductance significantly.

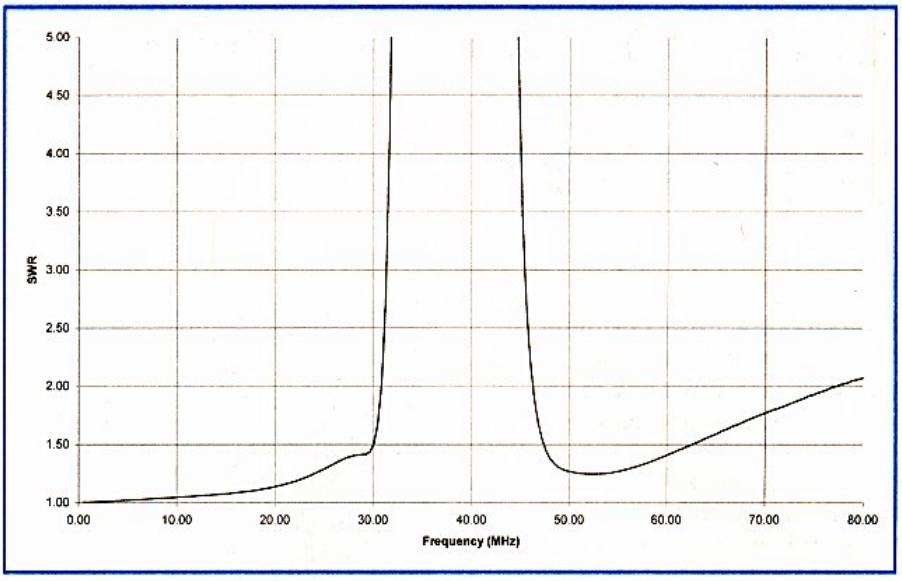

Fig 2 – SWR at the transceiver port with the antenna ports terminated with 50 ohms.

The choice of capacitor type for an RF filter for power application is limited. Above 10 watts or so the only type that is suitable is mica, silvered or otherwise, apart from perhaps large transmitting type ceramic which are expensive. At lower power levels small ceramic

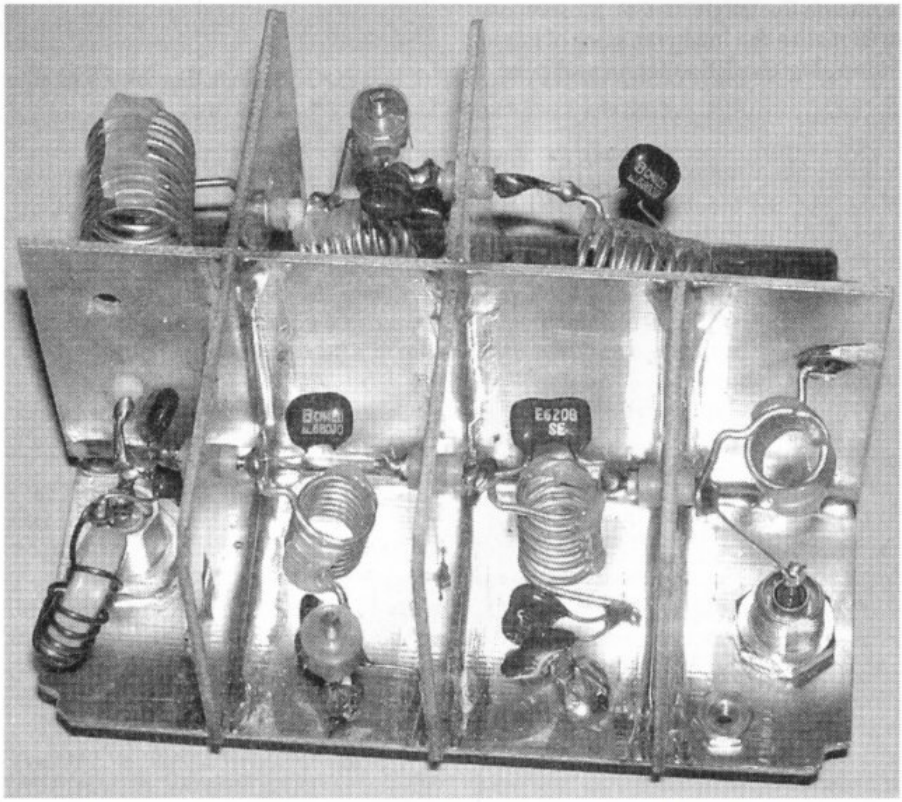

Photo 2. Internal view of the diplexer showing the high pass side.

capacitors can be used. Mica capacitors are not readily available though many hams with a sizeable collection of "junk" will have a stock of these and several units may be parallelled to make the required value. Both Farnell and Radio Spares stock silvered mica capacitors which would be quite suitable but they are expensive, $2.50 to $4.50 each.

Construction

As in all RF projects where significant power is involved some kind of metal box should be used. My diplexer is housed in a diecast box reclaimed from a disused project. The photographs show the construction method used. The base and shielding partitions were made from double-sided copper laminate soldered at the seams. It is not necessary to provide all the shielding as shown. The diplexer will work quite effectively, assembled on a flat base as long as adjacent coils are oriented at right angles to minimise mutual coupling.

Two trimmers have been included, one in each part of the diplexer. I found that the SWR at the filter input could be improved by adjustment of these trimmers.

Testing and adjustment

Connect 50 ohm loads to both antenna connectors and apply a signal at low power, a few watts, near the top end of the 10 m band to the diplexer input. Adjust trimmer C5 for lowest SWR. Change frequency to the bottom end of the 6 m band and adjust trimmer C9 for the lowest SWR. The two plots show the SWR at the input of the diplexer. The worst is 1.5 at 30 MHz, falling to 1.15 at 21 MHz. Over the 6 m band the SWR is 1.25.

The response plots show that the loss at 30 MHz is 0.6 dB falling to 0.15 dB at 21 MHz. The loss in the 6 m band is 0.3 to 0.4 dB. 0.4 dB represents a little less than 10% of the power.

Conclusion

This diplexer enables an HF antenna and a 50 MHz antenna to be connected simultaneously to an amateur radio transceiver with a common RF connector. It causes a minimum of disruption to the match of the antennas and feed lines to the transceiver and as an added bonus, it has more than 35 dB of rejection to harmonics above 35 MHz when used on HF.

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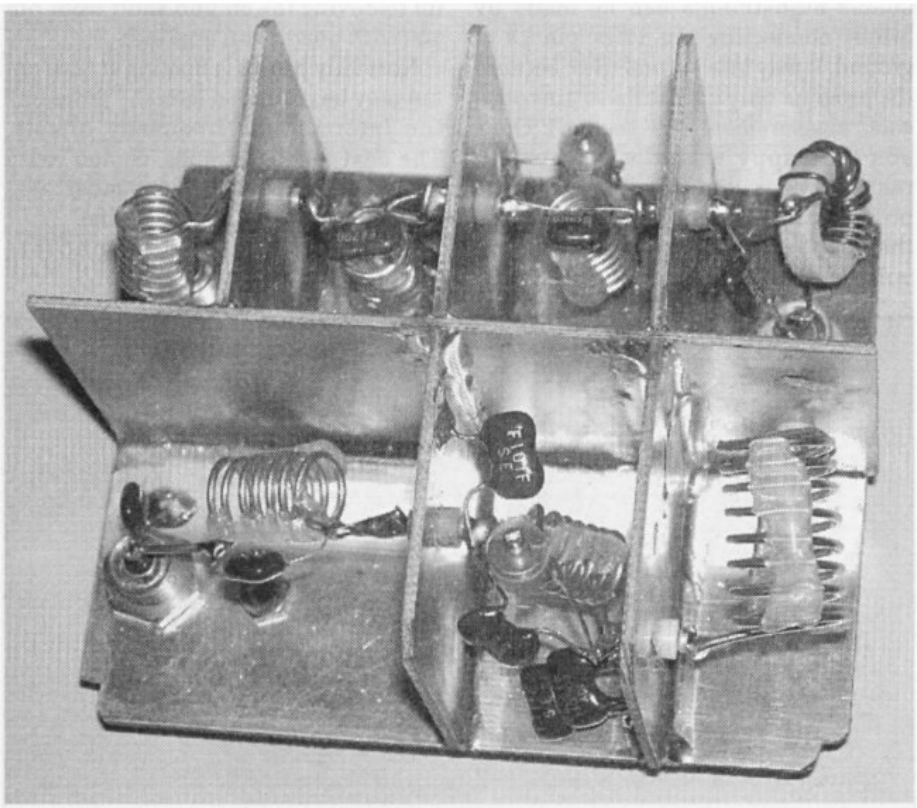

Photo 3. Internal view of the diplexer showing the low pass side.

The 2002 DFD updated

Phil Rice VK3BHR
http://ironbark.bendigo.latrobe.edu.au/~rice

Here is an updated version of the Digital Frequency Display, published in Amateur Radio in September 2002. Since then I have learned quite a bit about PIC programming and, with inspiration from a Web page by IK3OIL, have managed to perform all counting functions "on chip".

This version features a much simpler front end, an extended frequency range and a coarse calibration function implemented in software. It retains the ability to add or subtract one of three IF offsets, making it suitable as a frequency display for a direct conversion or superhet receiver (also for transmitters using "on frequency" VFOs or using mixing). Resolution remains at 10 Hz and accuracy is in the order of 100 Hz.

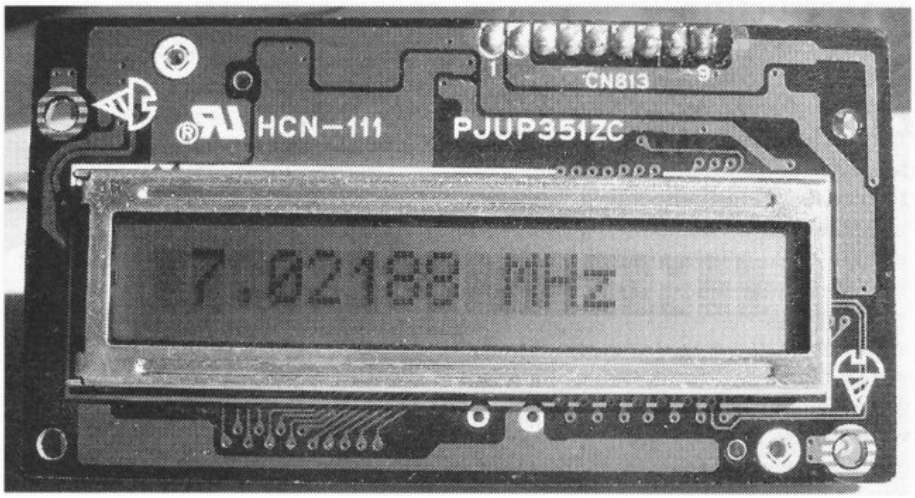

Photo 1 – LCD frequency display

How it works

A self biased common emitter amplifier produces a pseudo-TTL driving signal. The 10 µH inductor in the collector lead helps extend the high frequency response. Any "fast" NPN transistor should be suitable. I used a BFR91, but you may substitute a transistor scrounged from an old TV tuner or a VHF receiver.

The amplifier's quiescent Vce is set to 1.8 to 2.2 volts by the resistor marked * on the diagram. It is nominally 10 k, but you may need to change it. The collector voltage is applied to the PIC's counter/timer via a series 470 ohm resistor. The PIC is able to short this signal to ground via an internal pull-down transistor to disable counting. It is crude, but quite effective.

The PIC implements a 32 bit counter, partly in internal hardware and partly in software. Counting is enabled by turning off the internal pull-down transistor for "exactly" 0.4 second. At the end of this time, the PIC divides the count by 4, then adds or subtracts the appropriate IF frequency to get the actual frequency. The resulting count is converted to printable characters and delivered to the display.

Setting up

Before the frequency meter will work at all, it must be calibrated.

This involves starting with the power off. Pin 10 is connected to ground and the power is then turned on (and held on). The PIC will measure and display the input frequency, followed by the letters CAL. If you can't adjust the indicated frequency to the correct value (by adjusting the 33 pF trimmer), then coarse adjustments can be made by briefly connecting pin 12 or pin 13 to ground. It may take several tries; because the program only checks these pins once each measurement (0.4 second). Once you are happy with the adjustment, remove the ground from pin 10 (while power is still applied). This will cause the PIC to store the calibration in non volatile internal memory.

If you are lucky and use a 4 MHz crystal that is similar to mine, calibration may be as simple as (a) shorting pin 10 to ground, (b) turning the power on then (c) removing the ground short from pin 10 (with power still applied).

Normally pin 10 is floating at turn on, but may be grounded later to "program" the Intermediate frequency offsets. The next few paragraphs, copied (with amendments) from the September 2002 article describe how this is done.

To program the intermediate

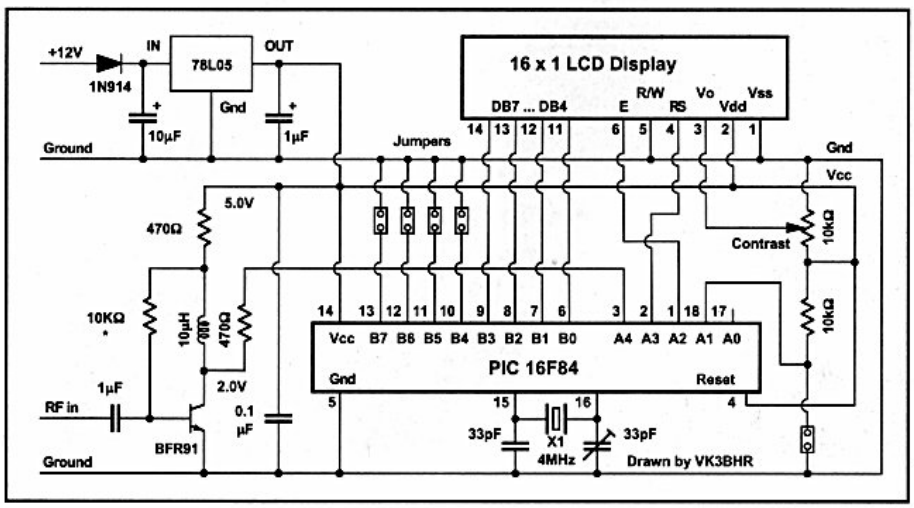

Fig 1 – Circuit of the updated Digital Frequency Display.

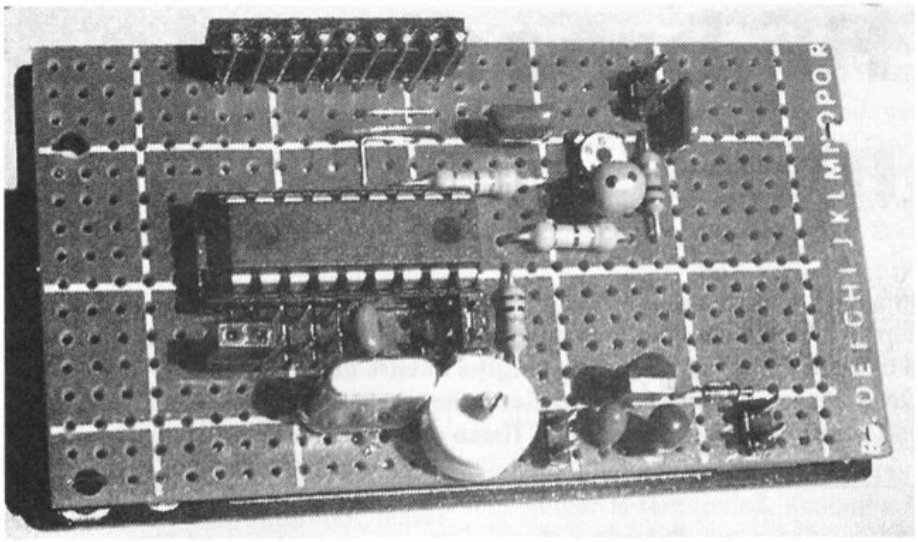

Photo 2 – Component side of the circuit board.

frequencies, connect the BFO to the counter then set up the PIC as follows: ground pins 12 and/or 13 of the PIC to select one of three IF offsets. Pin 12 when pulled low, indicates the BFO is on its lower frequency. Pin 13 when pulled low, indicates the BFO is on its higher frequency. Alternatively, you can pull both pins 12 and 13 low to use the third offset. If both pins 12 and 13 are left floating, the PIC will not actually store anything!

To store the measured BFO in the selected internal EEPROM, just ground pin 10 of the PIC for at least 0.5 second, then release it.

For normal operation, the RF input of the counter is connected to the receiver VFO and the PIC uses the stored IF offsets to calculate the actual frequency. If neither BFO selection pin (12 and/or 13) is pulled low, the PIC uses the average BFO frequency. If no IF offset is required, just measure and store 0 Hz for both offsets. Alternatively, you can pull both pins 12 and 13 low to use the third offset (which must also be programmed to 0 Hz.)

Pin 11 when held low, indicates that the selected IF is to be added to the measured VFO frequency to give the indicated frequency. If pin 11 is floating, then a subtraction is done (VFO-IF or IF-VFO, whichever is appropriate).

Some LCD displays are configured as "8 character by 2 line" but with all the characters displayed on the one line. To cater for these displays, the PIC tests pin 18 occasionally. If it finds this pin grounded, it inserts a "move to line 2" command after the eighth character. If your display only shows eight characters, then try grounding pin 18 of the PIC.

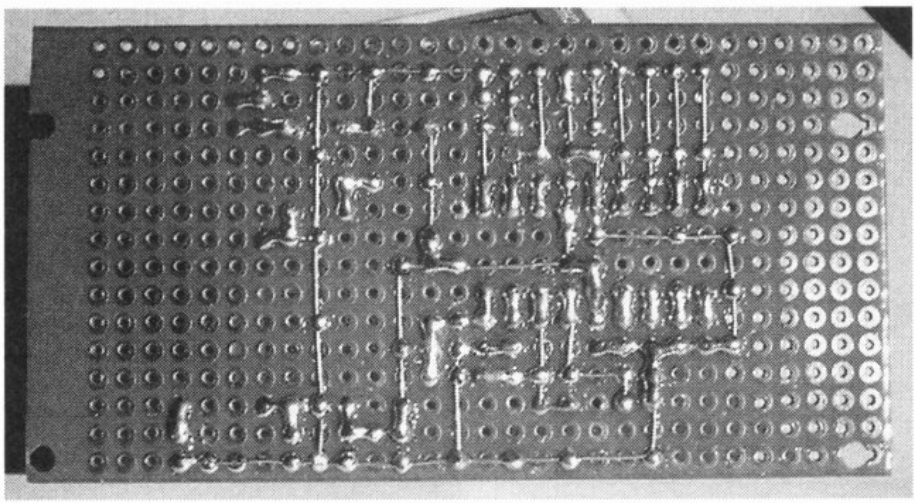

Photo 3 – Underside of the circuit board.

Getting the software

The source code for this version is available on the web at http://ironbark.bendigo.latrobe.edu.au/~rice or I can mail a copy on disc.

If you don't want to go to the trouble of building a programmer and downloading the software (you will also need the Microchip PIC assembler), then I could visit my local Jaycar store and buy a chip. A cheque for $15 would cover my costs (the price of the chip plus postage).

The last word

This frequency meter has much simpler hardware than the 2002 version and, because of "improvements" in the software (32 bit counter instead of 24), has a higher frequency limit. The 2002 frequency meter was hard limited to 41.94303 MHz. This one exceeds 50 MHz, limited only by the PIC's counter/timer. The prototype was still counting reliably at 60+ MHz.

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Practical HF broadband wire antennas

Marc Robinson VK2BUA
www.pca.cc

Early in my training I was taught that an antenna must be cut and tuned to a multiple of a quarter wavelength, if it is to radiate efficiently. That statement still holds true but we can bend the rules and trade a bit of the efficiency for bandwidth when we need it. Such is the case with the lengths of wire described here. All are proven in commercial installations I have engineered here and there along the track. Back in the 80s I used to make up and sell a 'Starters Kit' for those wanting to likewise dabble. These days you are on your own!

Why broadband?

Modern high frequency radio communications networks demand great flexibility in antenna design. Channel scanning, frequency hopping and cross band working all call for antennas that have to work instantaneously over a very wide bandwidth, sometimes the complete HF spectrum.

Why wire?

Wire antennas are generally simple to erect. They can often be supported from existing masts, trees or buildings and a multitude of designs can be constructed that will satisfy the broadband requirement. These can be as elaborate as a 'Rhombic' or 'Vee Beam', or as simple as a 'Dipole' or 'Long Wire'.

Antenna or dummy load?

While they come in many shapes and sizes, the configurations briefly outlined here are all classified as 'Travelling Wave' Antennas (TWAs) and to be more precise, 'Ground Terminated' TWAs. They have also been called 'Radiating Dummy Loads' by the unkind, which carries a small degree of truth when the size is restricted. To be efficient for transmitting, particularly on the lower frequencies, 'big is beautiful' and they require a rather large amount of 'Real Estate'. However, they can be designed to be directional and have quite reasonable gain. Another very favourable feature is that they generally present a stable load for the transmitter driving them, resulting in a maximum transfer of power, a cool transmitter and clean transmission.

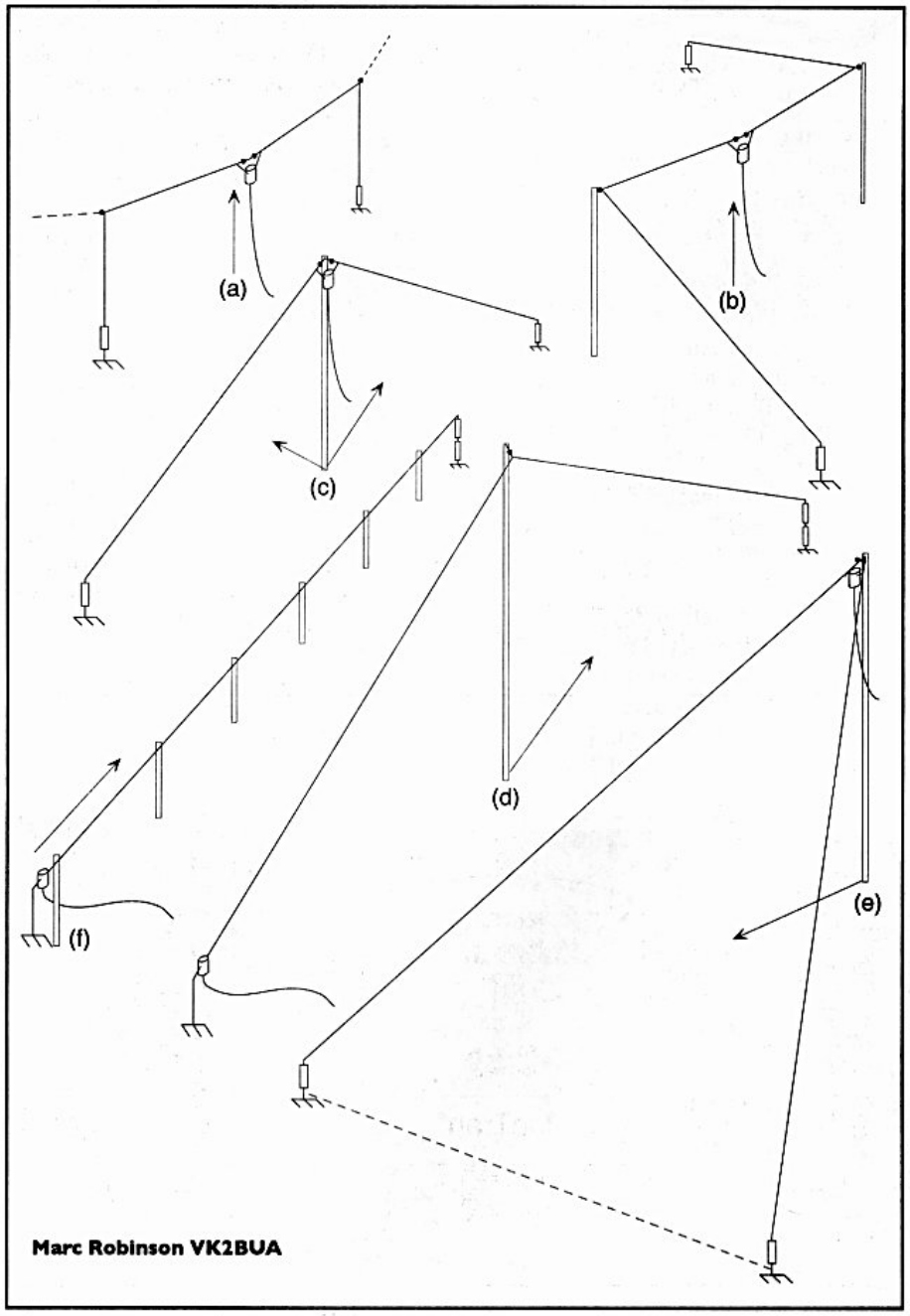

Fig 1 – A few practical wire antennas (see text).

Reception?

Ground terminated TWAs make very good receiving antennas because the terminations prevent any static build up on the antenna wire, keeping the noise level low.

Which antenna?

While 'boffins' might at this point get out a site plan and run up their PC antenna simulation programs to come up with the perfect design, Figs 1(a) to (f) give a few practical designs. Suggested dimensions are all 'very flexible' and can be varied by 20% or more without worry.

(a) illustrates a centre fed dipole strung between two supports, masts, trees, etc. The ends of the dipole are dropped vertically to ground level where each connects via a 'Terminator' to ground. Suggested dimensions for 2-30 MHz operation are 35 m (115 ft) across the top with 15 m (50 ft) down drops. This antenna is basically omni directional, providing high incidence radiation at lower frequencies for local working out to about 1500 km or 950 miles and higher frequency low angle radiation beyond.

(b) is the same antenna, but with the down drops taken out in some direction beyond the supports. This is a way to extend the length of the antenna and so improve performance on 2 MHz frequencies and lower. Don't lengthen the down drops to more than about twice the support height.

(c) is a centre fed inverted vee configuration. It may be more practical to have one taller mast, say 30 m (100 ft) rather than two smaller ones like in (a) and (b). Each leg length should be about twice the mast height. Radiation is omni directional at the low frequencies, becoming bidirectional as the frequency increases.

(d) uses the same physical construction and dimensions as (c) but the feed point is shifted to one end and the other is terminated. Radiation is in a direction away from the feed point towards the terminators. This antenna is effectively a vertically polarized 'Half Rhombic', with the missing half being mirrored by the 'ground'.

(e) is also a 'Half Rhombic', this time horizontally polarised and commonly known as a 'Vee Beam'. Mast height should be as high as possible to keep the vee as steep as possible, resulting in low angle radiation for long distance working. A good apex angle for the vee is 60 degrees with maximum radiation from the vee opening. Six legs could be arranged symmetrically from a single centre pole, preferably on high ground with the legs dropping down to lower ground. Relay switching could select pairs of legs in turn to form a 360 degree steerable antenna.

(f) is a form of 'Beverage,' more suitable for reception than transmission. It consists of a single wire run 1 to 2 metres off the ground along a fence top for quite a long distance, say 50 to 500 m. This antenna receives very well at LF and medium wave where it is directional from the feed point to the terminators. At HF it radiates almost directly upwards, depending up earth conditions beneath it.

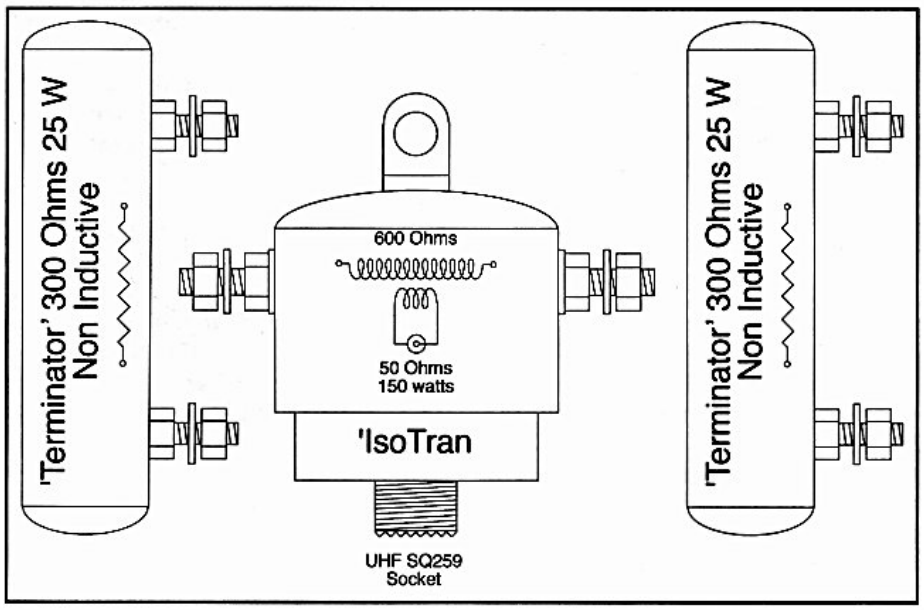

Fig 2 – A little starter kit I used to make and sell under my IsoTran brand back in 1980-90. I'm sure alternatives can be sourced or made up to suit.

Key components

Two essential items are needed to put any of these antennas together:

The first is a 50 to 600 ohm IsoTran (Isolating Transformer) - see Fig 2 - with a power rating to suit the transmitter output. Depending on the design, a TWA will generally have a feed impedance between 450 and 750 ohms, so 600 ohms is a good compromise. Why not a Balun (Balance to Unbalanced) transformer which is so commonly used to couple a coaxial cable to a balanced antenna? The balanced winding of a Balun effectively has a centre tap connected to the braid side of the unbalanced winding. This presents no problem when the antenna is constructed with perfect symmetry, both legs of the same length, no objects close to one leg and not the other, etc. Many of the antennas described here are unbalanced because of odd leg lengths or ground terminations. Any antenna imbalance causes out of balance currents to flow through the local ground system and back along the braid of the antenna coax, inducing noise or RF radiation. For this reason a Balun is not recommended. A much better choice is an IsoTran with isolated primary and secondary windings of the correct ratio. This allows the Antenna to 'Float' and take up a natural balance above ground without inducing currents into the coax feed line.

The second item is a pair of 300 ohm non inductive wire wound resistors (Terminators) which are used to terminate the far end of each leg of the antenna to ground, hence the 'Dummy Load' analogy. Note that in the case of end fed models, both terminators are connected in series to ground at the far end of the antenna. Each 'Terminator' should have a wattage rating of at least

20% of the transmitter PEP for voice transmissions or 40% for continuous data. The amount of power dissipated in the 'Terminators' depends on the length of the antenna and the frequency in use. The shorter the antenna or lower the frequency, the more the 'Terminators' become the 'Dummy Load'. CAUTION: they could become a fire hazard if they overheat from excessive transmitter power and so, must be positioned and supported appropriately.

Other bits and pieces

What to make the antenna from? A visit to your local boating warehouse should provide the answer. You can't go wrong using very flexible small diameter stainless steel wire rope. Don't let anyone tell you that stainless has too higher resistance. A 2.5 mm (3/32 in) 7x19 strand stainless rope has a lot more surface area for RF to flow on than single or seven strand hard drawn copper wire. What's more, it is far more flexible and has a breaking strain around 420 kg or 990 lb. You will need a quantity of 2.5 mm copper swages, a hand held swaging tool and a 'Parrot Beak' wire rope cutter. The tools are a bit expensive but once you have used them, you won't go back to copper wire, wrapping and soldering. The same warehouse should also have a good selection of pulleys and 'UV proof' nylon rope to support the antenna. Pulleys and counterweights are essential to avoid damage when the supports are trees that sway in the wind. A good counterweight is a sturdy plastic bucket with a few holes drilled in the bottom so it will drain, filled as necessary with sand and rocks to tension the antenna. You will need to source a supply of strain 'Egg' insulators and ground stakes and clamps (probably from your local electrician).

Coax cable

I won't go into too much discussion on coax cables and connectors, except to say; don't hang the down drop of coax from the IsoTran by its connector. Loop and tie the coax through a spare 'Egg' insulator before fitting the connector and hang the insulator and IsoTran from the antenna, between the two centre insulators. Use RG58C/U coax cable with a stranded centre conductor for receivers or transmitters up to 400 watts, or RG213 for higher power or runs longer than 30m. Only use coax connectors which have a soldered centre pin and sealing gland that does up on the outer braid and sheath. Have self amalgamating tape ready to weatherproof them.

Rigging

Antenna assembly is relatively easy when using stainless wire and swages. It's a matter of slipping a swage onto the wire, threading the wire around the insulator and back through the swage. Leave more than enough tail to go to the IsoTran or Terminator, slip the swage up close to the insulator or thimble and crimp with the swaging tool. To terminate the tail on the IsoTran or Terminator, form an eyelet by pushing the wire through a swage and then back on itself. Make the eyelet a snug fit on the terminal before crimping the swage. By now you will probably have stuck yourself a few times with the sharp ends of the wire strands. Tape the ends so you don't catch your fingers further when rigging the antenna. If you have a 'Sea Scout' or 'Ancient Mariner' in the team, tying off or splicing the nylon rope on the insulators will be no big task, otherwise pick your best knot and hope it holds. Always melt the nylon end strands of the rope tails to prevent them fraying and unraveling. (A cigarette lighter and glass of water required). Don't touch the molten nylon unless the team includes a doctor.

Grounding

Since the Terminators themselves are 300 ohms, the resistance of the ground connections for these antennas is not as critical as it would be for say, a quarterwave ground plane antenna, where the base impedance may be as low as 10-20 ohms. Nevertheless, a few rules must be applied. Don't elevate the Terminators. Keep them low to the ground and the lead to the ground stake or buried ground wires should not exceed 1 m or 3 ft. Likewise for the IsoTran on end fed antennas where one side of the 600 ohm winding of the IsoTran must be grounded. In dry ground use multiple ground stakes or run a buried ground wire between the two Terminators at each end of the antenna.

So, go pull up some wire!

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Notes on HF transmitting coils

Drew Diamond VK3XU

Inductor coils are used in just about every item of radio equipment whose performance largely depends upon coil efficiency. Indeed, transmitting coils are a hot topic, so it is a pity that much of the accumulated wisdom regarding practical coils (such as that contained in References 1 and 2) has not been fully carried over into contemporary amateur literature. Never-the-less, a web search generally produces plenty of worthwhile material (eg Reference 3).

Good electrical conductors carry alternating currents only to a certain depth due to the flux produced by the conductor itself, and is a function of the current's frequency. Depending on the size of the conductor, it becomes so pronounced at very high radio frequencies that practically all of the current flows in a thin layer on the "skin" near the surface of the conductor, which effectively increases its resistance. A more lucid explanation may be found in Reference 4.

Another factor which seldom gets a mention in amateur texts is "proximity-effect". When two or more adjacent conductors (as in a radio coil) are carrying an RF current, the current distribution in one conductor is affected by the magnetic flux produced by the adjacent conductor(s), forcing the current to flow on the surfaces of the conductors that lie adjacent to their neighbours, thus causing the effective resistance to be higher than for skin-effect alone (see Reference 1, p36, and Reference 5, p119). Proximity effect can be reduced by space (rather than close) winding the turns. Edge wound copper strip is sometimes used professionally to further reduce this effect (Reference 1, p37 and Reference. 3).

The "goodness" or (Q)uality of an inductance at a particular frequency is indicated by its Q, which is a figure of merit defined as "the ratio of energy stored to energy dissipated per cycle", and may be expressed as pure reactance/effective resistance –

$$Q = \frac{X_L}{R}$$ ...(Reference 5, p108).

Effective resistance of a coil for high frequency work is determined by several considerations. Chiefly they are physical size, conductor material, dielectric material (both on, and near the coil's wire), magnetic core material (if used), form factor, being the ratio of winding length to diameter (for a plain solenoid), and the electro-magnetic nature of any objects within the coil's field.

The oft-quoted (and quite accurate) Wheeler's formula for inductance is (Reference 1, p55, here metricated courtesy of Tim Hunt VK3IM):

$$L_H = \frac{0.0098 \times N \times N \times d \times d}{1 + 0.45 \times d}$$

where N = number of turns, d = diameter in cm, l = winding length (of the coil – not the wire) in cm.

Depending upon the application, there are many conflicting factors affecting the design. However, some empirical "rules of thumb" may be applied to the sort of solenoids we use for antenna couplers, power amplifiers and loading coils:

1. Form factor - ratio of Length: Diameter should be in the range of about 0.5:1, to 4:1.
2. Q increases roughly in proportion to the square root of coil diameter - where wire diameter must increase in proportion to coil diameter.

Accordingly...

3. Use a wire that is somewhat smaller than the space available such that distance between turns is about 0.5, to 1.5 wire diameter.
4. Employ the minimum of dielectric material in, and near the coil's field.
5. The coil should be situated as far as practicable from other metal objects.

Item 2 needs some clarification. There is no harm in aiming for the highest practicable Q. In most applications, however, there will be a point of "diminishing returns", where system losses mask any improvement above a

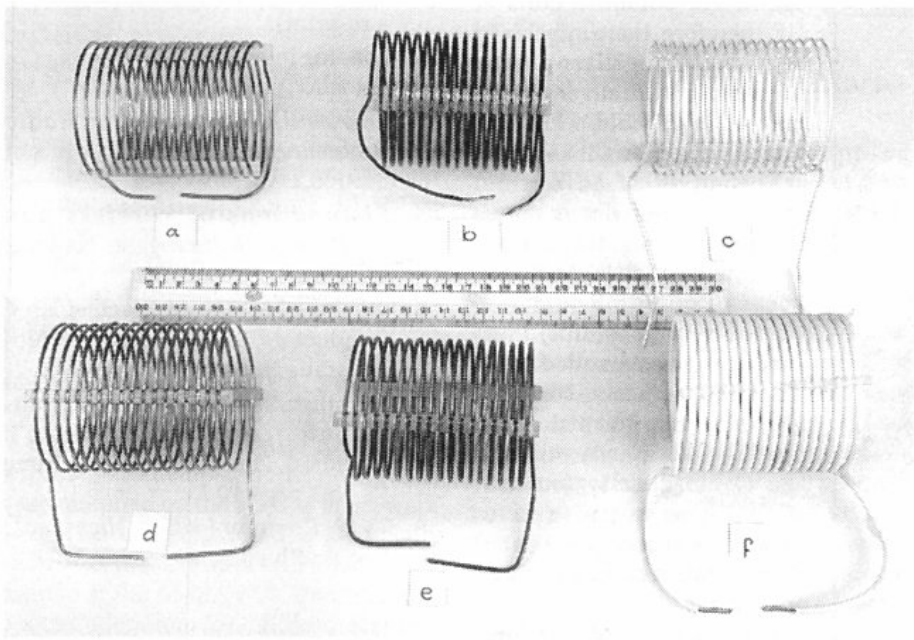

Photo 1 - Test coils a ~ f.

certain value of Q (Reference 3).

One may question why dielectric material (which influences capacitance) has anything to do with inductance. We must remember, however, that real-world coils have unavoidable (but often reducible) parasitic or "stray" capacitances between turns, and also from those turns to nearby objects, hence they become part of the capacitive arm of the circuit. So, all dielectric matter, including the former and any insulation upon the coil's wire, should therefore be minimal and composed of suitably low-loss material.

The question of what surface coating is best for radio coils was addressed in a classic paper by Alan Fowler (Reference 6). To satisfy my own curiosity as to what effect (if any) the coating or dielectric material on the wire may have upon the Q of a typical coil, six solenoids were made using 2 mm diameter soft copper wire, winding pitch 5 mm, 9 cm length, 7 cm diameter, fabricated in accordance with details provided in a recent article (Reference 7). The following surfaces were tested and results obtained:

Test Frequency	1 kHz		3.6 MHz	
	L µH	Q	L µH	Q
a. Plain bright copper (Cu)	12.5	3.1	12.8	350
b. Enamelled Cu.	12.8	3.0	12.8	340
c. Silver-plated Cu (0.025 mm depth)	12.5	3.1	12.8	350
d. Tinned Cu.	13.2	3.1	13.3	340
e. Oxidized Cu.	12.5	3.1	12.8	330
f. Insulated stranded electrical wire.	14.0	2.6	13.9	240

At a test frequency of 7.2 MHz, Qs were generally about 100 less than those shown for 3.6 MHz, except for the plain Cu coil, which yielded 270. Interestingly, the measured Q at 1 kHz agrees very well with the dc resistance of the coil. Re-arranging the above formula for R = XL/Q, where XL at 1 kHz = 0.082 ohm, 0.082/3 = 0.027 ohm. Measured dc resistance is typically 0.021 ohm.

Skin depth in mm may be calculated (Reference 1, p34, Ref. 8, p14.57):

$dmm = 66.2/\sqrt{f}$

where f is in Hz. At 3.6 MHz skin depth is about .035 mm, and at 7.2 MHz it is about .025 mm. The silver-plating thickness is also .025 mm, yet it appears that the Q of my test coil is not measurably improved.

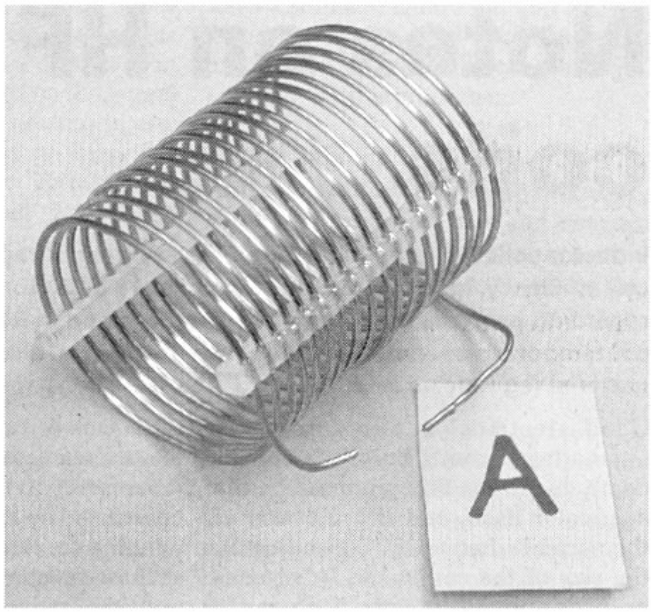

Photo 2 - Plain bright copper wire coil 'A' has a Q of 350 at 3.6 MHz.

Conclusion

Plain bright copper and pure silver-plated copper achieved the same Q value at 3.6 MHz, all other factors being substantially equal. Enamelled and tinned scored a slightly lower figure. Oxidized copper was slightly lower again. For solenoid coils at HF, therefore, there appears to be no benefit in silver-plating the wire. Indeed, silver-plating may actually yield a lower Q than for plain bright copper.

The effect of an enamel coating on the wire is not as bad as has sometimes been suggested, which is good news because many of our coils (eg baluns and toroids) must perforce use enamelled wire. Tinned copper scored similarly. The effect of a greenish oxide coating does appear to lower the Q marginally, but not so much as to cause us to be greatly worried about all those tarnished coils in older equipment.

A (perhaps surprisingly) notable disappointment is the coil made from ordinary stranded insulated electrical wire, which may be adequate in an emergency, or where no other wire is available, but it certainly should be avoided where best efficiency is required.

References and further reading

1. *Radio Engineers' Handbook*; F Terman, 1943.
2. *Radio(tron) Designer's Handbook*; F Langford-Smith. 4th edition RCA/AWA, chap 10 and 11 (available as a re-print).
3. "Loading Inductors"; www.w8ji.com (excellent).
4. *The ARRL Handbook for Radio Amateurs*; see chap 10 in any recent edition.
5. *Foundations of Wireless and Electronics*; M Scroggie. Newnes Technical.
6. "RF Performance of Electroplated Conductors"; A Fowler, Electronics Australia, July 1970, pp 69 - 71.
7. "Another Method of Making 'air-wound' Transmitting Coils"; Diamond, *Amateur Radio* Volume 73 No3 page 10
8. *Radio Communication Handbook*, RSGB, 7th edition.

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Beyond our shores

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Philippines:

Hams may lose 70 cm

Hams in the Philippines are wondering how long it will be before they are ordered off the 70 centimetre band. This, after that nation's National Telecommunications Commission announces the inclusion of all of that band in spectrum it is considering being made available for broadband wireless networks.

The regulatory agency made the suggestion in a memorandum titled "Frequency Band Allocations for Broadband Wireless Access." The surprise was the inclusion of 410 to 495MHz in nine bands. This includes the Amateur and Amateur Satellite spectrum including the internationally agreed to allocations.

The Philippines National Telecommunications Council says it proposes to reallocate spectrum for broadband wireless networks in line with the thrust of the government to promote and facilitate the development of information and communications technology. Right now only about 5% of the population in The Philippines has access to the Internet, much less broadband, and this is partly due to the lack of infrastructure.

(ARNewsline)

Space:

STS-14 features a 6 ham crew

Amateur radio operators make up 6 of the 7 crew members of the STS-114 Space Shuttle mission crew. They are Mission Commander Eileen Collins, KD5EDS; Mission Specialist Wendy Lawrence, KC5KII; Mission Specialist Charles Camarda, KC5ZSY; Mission Specialist Soichi Noguchi, KD5TVP; Mission Specialist - Andrew Thomas, KD5CHF and Pilot James Kelly, KC5ZSW.

Also carried on the STS 114 mission is the PC SAT2 ham radio satellite. It will not become operational until it has been mounted on the I-S-S. A spacewalk to do this was scheduled to take place shortly. A presentation on PCSAT2 was be held at the AMSAT-UK International Space Colloquium in Guildford, England from July 29th to the 31st.

(M5AKA, AMSAT-UK)

Global:

Log Book Of The World

The ARRL's *Logbook of the World* (LoTW) now has surpassed 10,000 registered users worldwide!

LoTW, which went on line September 15, 2003, provides a global repository of participants' logs. When both participants in a QSO submit matching QSO records to LoTW, the result is a "QSL credit" that can be eventually applied toward many awards.

To date, more than 75.1 million QSO records have been entered into the system, resulting in nearly 3.5 million QSL records or matches among uploaded logs. At present ARRL LoTW QSO credits are applicable only toward DXCC, but plans call for supporting other awards, such as WAS and VUCC, in the future.

To ensure system integrity, LoTW users first must obtain a free digital certificate, used when submitting log data to the database. Users incur a fee only when they apply QSL matches from LoTW toward a particular award. The specific fee varies depending on the number of credits purchased at one time.

The LoTW Web page http://www.arrl.org/lotw has complete information on how to register and use the system.

(ARRK)

U.S.A.

FCC proposes dropping Morse Code requirement

The FCC has proposed dropping the 5 WPM Morse code element as a requirement to obtain an Amateur Radio licence of any class. The Commission included the provision in a July 19 Notice of Proposed Rule Making and Order (NPRM&O) in WT Docket 05-235, but it declined to go along with any other proposed changes to Amateur Service licensing rules or operating privileges. Dropping the Morse code requirement or any other changes to Part 97 would not become final until the Commission gathers additional public comments, formally adopts any new rules and concludes the proceeding with a Report and Order specifying the changes and an effective date. That's not likely to happen for several months.

The FCC received some 6,200 comments to their petition. The Commission said it believes dropping the 5 WPM Morse examination would encourage more people to become amateur radio operators, and would eliminate a requirement that's "now unnecessary" and may discourage current licensees from advancing their skills. It said the change would "promote more efficient use" of amateur spectrum.

To support dropping the code requirement, the FCC cited changes in Article 25 of the international Radio Regulations adopted at World Radiocommunication Conference 2003. WRC-03 deleted the Morse testing requirement for amateur applicants seeking HF privileges and left it up to each country to determine whether or not they mandate Morse testing. Several countries already have dropped their Morse requirements for HF access.

The ARRL had suggested a new Entry-Level licence. However the FCC said it did not believe a new entry-level licence class was warranted because current Novice and Tech Plus licensees will easily be able to upgrade to General once the code requirement goes away.

(ARRL Newsletter)

Canada:

drops Morse requirement

Industry Canada (IC) has adopted elements of the Radio Amateurs of Canada (RAC) "Proposal on Morse Code and Related Matters" and has essentially removed the requirement for Amateur Radio applicants in that country to obtain a "Morse Qualification" for access to bands below 30 MHz.

"Morse code will no longer be the sole additional requirement by which Canadian radio amateurs will gain access to the HF bands, but it will remain as one valid criterion," Industry Canada said in its Notice announcing the regulatory change. Industry Canada said it will continue to include Morse code as a consideration in granting access to the HF bands. "However, this is only one criterion and the measure of HF operator abilities should not be limited to this one facet of operator skills," IC added.

(ARRL News)

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ALARA

Christine Taylor VK5CTY

ALARA's 30th Birthday

Unfortunately due to a number of conflicting engagements there were very few YLs on for the Birthday Net on 23rd. However, I understand that the few did have a good chat. I also understand that a couple of OMs joined in later to swell the ranks.

For the 30th Birthday Luncheon on 31st July the story in VK5 was very different. There were 14 YLs and 6 OMs at the Marion Hotel. The food was good but the friendship was even better. We are fortunate in VK5 to have kept contact with our members through our monthly lunches and because a number of us are members of the same radio club.

The photo shows two of the earliest members of ALARA cutting the cake with flags and chocolate recognising the important milestone for ALARA.

Myrna VK5YW tells me that Lorraine, VK5LM, joined ALARA before she did but Myrna is remembered as the controller for the very first ALARA Net. Even though the log of that Net (and the subsequent ones) show that there were as many OMs as there were YLs, the OMs were there to allow their YLs to be on the air. So many of us have started just that way.

The Newsletter produced by Dot VK2DB was especially colourful and interesting, also in recognition of the important birthday. The birthday year will be completed with the ALARAMEET in Mildura.

We can be said to have celebrated our birthday in style

Two of the earliest members of ALARA cutting the cake in VK5

ALARAMEET news

Bookings have been confirmed for nearly 50 and the plans are all in place. The weather is booked to be beautiful and the company will certainly be great. The weekend of September 9th to 12th will be one to remember. There will be a number of ZL members and at least two DX members from further away. It all sounds very exciting.

I hope you didn't forget the contest

By the time you read this, the ALARA Contest will be over and decided. I hope you were there. Maybe you were also active in the Remembrance Day Contest, too. That is an excellent way to make sure your rig is in order and ready for the ALARA Contest. If you forgot this year, remember next year, please.

VK5 YLs celebrating ALARA's 30th birthday

Speaking of making sure your rig is working...

After being disconnected and packed away for nine weeks I left it to my son (a computer buff rather than a radio buff, but still good at connecting units together) to re-assemble my rig. He did a great job. I could hear everyone very well.

I only listened for a couple of weeks but decided to join in on the third week. I pushed the button on the desk mike. The receiver went quiet, but no one heard me!! I tried several times with no more success. I even tried a couple of other mikes, but nothing worked.

So I rang the home QTH of one of the YLs on air and explained the situation... At least they knew I was there and could hear them all.

During the week I again tried to get it all to speak as well as to hear but eventually had to ask for help.

After much testing and undoing of plugs – rather fearful that wires could be broken before their connections had been identified, my rescuer discovered that one of the connections could be and had been plugged in 180° out of phase.

On very close inspection there were two almost invisible white dots to indicate the right way up, but there was absolutely no locating mark on the plugs at all.

There are now large, very visible white marks on the matching plug and socket.

Spreading the publicity in VK2

Recently Dot VK2DB again ran a stall at the Gosford Field Day which was the focus for YLs all day. Dot has been showing the flag for ALARA at Gosford for over ten years. A number of YLs have been inspired to sit for their exams and ALARA has gained quite a few members through our exposure at Gosford.

Is there a HAMFEST or Meet in your area at which you could encourage other YLs to join our select band? Pat VK3OZ has encouraged several very young

Spotlight on SWLing

Robin Harwood VK7RH

Signals are slowly being heard in our local evening hours after being dead over the winter months. The sunspot numbers are also slowly climbing back up again but there are still extensive fadeouts disrupting HF propagation. I have also noted daytime propagation particularly from China seems to be increasing. A relay on 13610 of one of the domestic networks seems to be almost around the clock. The firedrake jamming seems to have been replaced by relays of domestic networks.

Remember the long time Israeli Defence Station 4XZ? It used to be heard on a variety of channels with a CW marker and was a pretty reliable indicator for mid-eastern propagation. This was especially true for the 30 metres allocation as it used to be on 10046. You may be wondering where it has gone. I believe CW was replaced by the use of a sophisticated digital technology. I believe it has already been observed here in Australia on 8780 and surprisingly on 7160, on USB. I am certain that it will appear on other channels.

In last month's magazine there was an excellent article and background of the new DRM technology by John L Cartmill, VK4BJ. Here is the latest from John.:

"I am still receiving DRM most evenings from DW from Trincomallee on 21.675 and it is the most reliable at 0700 UTC

"Of interest as well is the DW signal on 7265 which I am able to 'see' most afternoons at 0600 UTC. The other evening I resolved sound with very few dropouts for the better part of an hour. Quality was excellent and the absence of any background noise made it a pleasure to listen to. This signal also carries a fair size test service including schedules and news items. I was able to resolve much of this as well. Later in the evening, around 1100 or 1200 UTC it is often possible to hear Kuwait on 13620. This is in Arabic. Last night at 1630 UTC, I heard DW on 13790 at low dropout. Between 18 to 20 hours UTC DRM signals from Europe may be observed."

As I have previously mentioned, I recently invested in broadband and I have been extensively downloading international stations including several rarely heard on shortwave. Naturally it isn't the same but still worthwhile. I also discovered several applications on my computer had hidden spyware especially on one well-known instant messenger program. It was secretly recording every keystroke and mouse movement I was making. This information was being sent back to Washington State. I quickly removed it once my firewall determined what was going on. I expect that the user may or may not have been made aware in the fine print in the "I accept" message that this was there. The moral is many so-called free programs may have hidden spyware applications lurking on your computer, so it is recommended that you keep your anti-spyware programs regularly updated.

Well that is all for September and good monitoring!

73 from VK7RH

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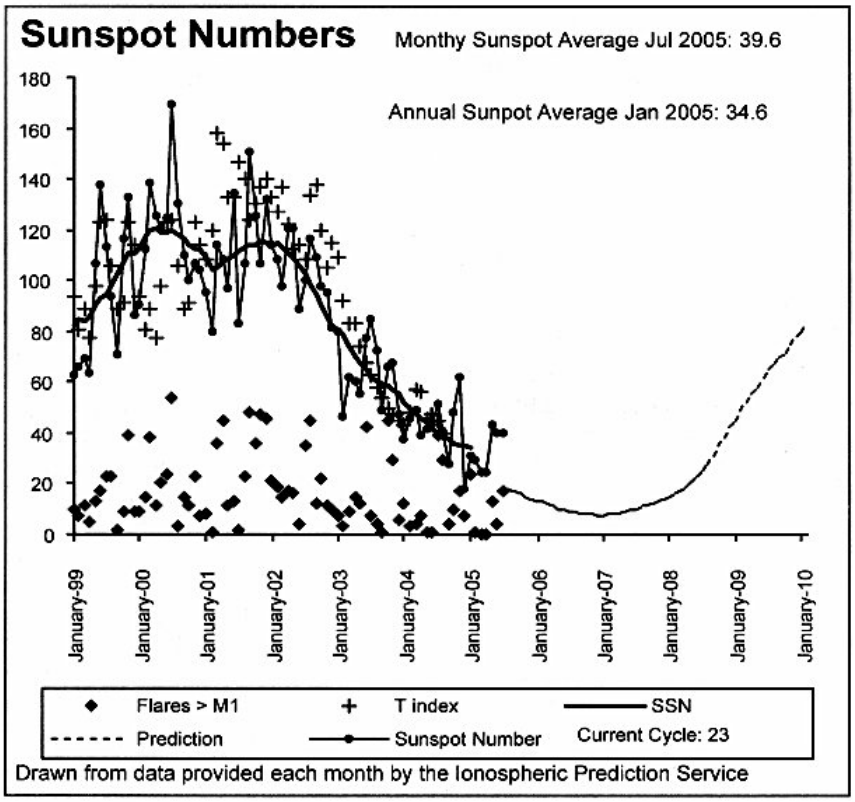

ALARA *continued*

ladies to sit for and pass their exams recently. It is great to know that we can attract the very young as well as the not so young.

After all what other organisation is there in which you will be a Young Lady all your life?

WWW special interest group for YLs

A new YL-IRLP NET has begun in Australia, running from 7.00am EST on the 1st and 3rd Sundays of each month. They are keen to attract all YLs but especially the younger ones (though OMs are allowed to join in, too) so if you are awake at 7.00am on a Sunday, tune in to IRLP Reflector 9258 and have fun.

This group apparently has grown out of a packet YL group about which some of you may have known before.

The Net control will be shared between Ann ZL3TNT and John KC8FRW which shows an international flavour.

You can get more information by email to Shirley VK7HSC on shirmax@southcom.com.au.

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News from...

VK2

Tim Mills VK2ZTM.

The 6 metre VK2RSY beacon was restored late July with a temporary transmitter on the new frequency of 50.289 MHz. Mode is CW, power 12 watts to a wire dipole, about 5 metre above ground with the main lobe north and south. A permanent dedicated transmitter is to be constructed. Later in the Dural upgrade there will be an omnidirectional horizontal antenna on a more elevated support. The 70 cm beacon has seen better days, all the RF stages expired. It will be off for a while until an alternate system is constructed.

Likewise, the 2 metre system requires a new transmitter. All the VHF / UHF VK2RSY beacons, which operate from the VK2WI site, will be converted to the CW mode in place of the previous FSK mode.

The Morse transmission, currently only on 80 metres - 3699 kHz - has been fitted with a new solid state keying system. The previous system used a rather old computer reading a floppy disk. Les VK2KYJ designed, constructed and donated a solid state keyer. Thanks from AR-NSW to Les for his efforts.

There has been a change in the format of the Sunday morning VK2WI news session where the VK1WIA segment is now at 10 am, followed by VK2WI news at 1030 am. There are plans to introduce segments of the Q5 technical lectures. Times and operation frequencies are yet to be determined.

Major items of equipment from Deceased Estates will be made available to AR-NSW members by tender. This is expected to be in place by the September Trash and Treasure, on Sunday the 25th. The VK2WI news sessions will advise. The September date is also the weekend when the first of the training in the new accreditation is being undertaken. On the Sunday, both the T&T and the Home Brew meeting will be confined to the Parramatta car park. The Home Brew meeting will be a demonstration on workshop practice and safety.

It is planned to hold a meeting of VK2 clubs in conjunction with the National WIA on a tentative date of Saturday the 12th November at Amateur Radio House.

Silent key

Fred Herron VK2BHE

It is with great regret we advise the passing of Fred Herron VK2BHE, of Lismore.

Fred passed away at home on 2 August 2005, aged 79.

Fred was born on 12 February, 1926 at Kurri Kurri, NSW.

Because of financial difficulties Fred left High school at 15, Intermediate Certificate.

He got a job in the Justice Dept. as a depositions clerk. He joined the Air Force in 1944 to train as a pilot. The war ended before he saw active service.

Returning to the Justice Dept. he commenced studying to become a Solicitor. In 1949 he married and moved to Ballina as Clerk of Petty Sessions. He left the Dept in 1959, joining a local legal firm. He qualified as a Solicitor in 1961.

Continued interest in flying saw him get his Private, then Commercial Pilots License.

He got his Instructors rating, then became the Hon. Flight Instructor for the Northern Rivers Aero Club.

He taught several SARC members flying to get their Private Pilots Licence. He also took up Amateur Radio, joining the Summerland Amateur Radio Club. He wrote the Club's new Constitution in about 1975 and also assisted drafting the VK2 WIA Constitution at the same time. He was the first WICEN Coordinator for the Northern Rivers Region. He was the advisor and Hon Solicitor for SARC until about 1986 when his changing duties made it not possible for him to continue. He was on the Committee and President of SARC during this period. In 1984 he became President of the Law Society of NSW and travelled worldwide on its behalf.

Fred introduced many novel computerised methods into legal practices.

In 1986 he was appointed a Local Court Arbitrator covering from Casino to Tweed Heads.

He was very successful and popular with all these positions and accomplishments.

He kept up his membership and interest in SARC and WICEN to the end although failing health prevented him from being active to any extent.

His funeral was held in St Andrews Anglican Church, Lismore on Friday, 5th August.

There was an overflowing congregation including members of SARC who knew him.

Fred VK2BHE was a respected and highly thought of member by all those who knew him and will be missed.

Condolences and best wishes to his family and friends from all in SARC and Amateur Radio.

Vale Fred VK2BHE.

I personally knew Fred from about 1975 onwards. A great man.

John Alcorn, VK2JWA, SARC14
Treasurer, SARC.

VK7

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au Regional Web Site: reast.asn.au

Congratulations

This month to Vince, VK7VH and Ray, VK7NRS for coming equal first in the 160m Trans-Tasman competition. Vince and Ray operated the VK7CHT Central Highlands club callsign from a vineyard retreat on Bruny Island. Happy birthday to John, VK7JK for reaching 82 years young! John is still reading the VK7 Regional News broadcasts once a month, collecting our call-back statistics in the South and manages to find time to homebrew at the REAST gatherings on a Wednesday afternoon.

BPL trial in VK7 update

Many boxes and associated equipment are appearing on poles around Hobart and two locations have been announced - the Newtown and Mt Nelson postcode areas. The measurement team has taken background noise level readings and is awaiting the start of the trial. The latest start date was late August. Watch this space!

Central Highlands Amateur Radio Club of Tasmania

The 80 m dash for the Wadda Cup Contest is being held on Saturday the 24 September, starting at 8.00pm and finishing at 9.00pm EST. Check out the club website, cht.net for rules or the rules article in the July edition of AR Mag. This is a great, quick contest and I encourage you all to participate, it was great fun last year! The club's winter getaway weekend was held at Tiger Hut, Liaweene, over July 22-24. From all reports it was a great weekend with plenty of eyeball rag-chewing.

North West Tasmania Amateur Radio Interest Group

NWTARIG held a general meeting on Saturday July 30 at the Ulverstone Lions Club. There was quantity of estate amateur radio equipment for sale. Packet is back on the air in the NW with the return of Jim VK7JH's digi on 147.600. APRS is also making an appearance with Tony, VK7AX running the APRS UI-View web service showing position information and maps of VK and ZL APRS stations.

Northern Tasmanian Amateur Radio Club

Reports from Wednesday July 13's NTARC meeting was that it was a hoot! Phil, VK7JJ did a great presentation on using the antenna design software (MMANA). Almost 30 members and visitors from far and wide attended. Phil left us all itching to race home and get on the internet and download the software. Thanks Phil. JOTA is just around the corner so let Tony VK7YBG know via 7RAA if you are available. This is a great opportunity to give young people a really positive experience of AR.

Radio and Electronics Association of Southern Tasmania Inc.

The first REAST Computer Users Group meeting took place at the domain clubrooms on Friday July 29. Around 12 people visited us during the evening and several operating systems were played with. There were demonstrations of Linux, a router was fixed and much discussion was had about things digital. This group intends to meet each Friday night and cover anything with a computer in it! Thanks to Ken, VK7KRJ and his group of enthusiastic helpers, the clubrooms now have a CATV computer network, some PCs to play with and I understand WLAN is being considered, ahhh, some 2.4 GHz radio!

August 3 saw Martin VK7GN and yours truly present a session on BPL – Up Close and Personal. We covered the basics, types, frequencies, typical systems, what it sounds like and looks like, economics, politics and some detailed photos of the equipment that is appearing around Hobart. Martin,VK7GN then gave a demonstration of the Field Strength Measurement FSM software that was developed by Owen Duffy, VK1OD.

VK5

Radio Amateurs Old Timers Club of SA

The annual Luncheon will be held on Thursday 27th October 2005 at noon for 12.30 at the Marion Hotel, Marion Road, Mitchell Park.

Public transport:- Bus 243 from the city, alight at stop 24.

Do not forget your Seniors Card!

RSVP by 22/10/05 to
Ray Deane VK5RK
Phone 8271 5401
or Ron Coat VK5RV,
Phone 8296 6681.

Silent key

Jack Townsend VK5HT

Jack Townsend VK5HT died on 21st July 2005 after a long illness. He was 85.

Jack became a Ham in 1939 and joined the army in 1940. Later in June 1941 he transferred to the RAAF. He served in Darwin.

He was President of the RAAF Signals and Radar Club in South Australia and the Old Timers Association, South Australia. His other interests included the South Australian Yacht Club and the Beef Steak and Burgundy club, of which he was Wine Master for 8 years.

He leaves a wife Joan and 2 sons Ian and Graham and 4 grandchildren.

73 Jack.

Ray Deane VK5RK

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AMSAT

Bill Magnusson VK3JT

PCsat2 mounted during spacewalk

The flight of the Space Shuttle came to a successful conclusion on 9th August after a few anxious moments. It also marked the successful installation of PCsat2 on the ISS during one of the space walks by crew members. Many amateurs watched this on real time video as a result of the huge publicity machine that swung into action for the shuttle flight. PCsat2 is being commissioned as I write this and by next month it should have passed all tests and be put into full operation mode. Hearty congratulations to Bob Bruninga and his Midshipmen at the US Naval Academy. Keep an eye on the usual sources for up to date information as the scene is changing daily.

Another amateur radio satellite springs back to life

Launched way back in 1984, UO-11 was one of our longest living and most trouble-free satellites ever. It started to experience a few problems a couple of years ago when the 2.4 GHz beacon dropped to half power but all other functions continued as normal. The battery started showing signs of age a year or so ago and eventually UO-11 was only reliable when not in eclipse. In its early years UO-11 never experienced any eclipses. It was launched into a sun-synchronous orbit. But of course UO-11 didn't carry any propellant so it could not be maintained in this orbit and gradually drifted. For many years the batteries held their voltage right through any eclipses but this could not be expected to last. A few months ago UO-11 went silent during an eclipse period and it was thought that it had expired completely. Much was subsequently written about the loss of this iconic satellite. During its long life it had achieved a number of 'firsts'. It had been used in its early days to demonstrate the viability of digital store and forward communications. Ground breaking in its day. Its microwave beacon was used extensively as a test signal for receivers and pre-amps around the globe by those amateurs setting up for mode-S. A few weeks ago Clive Wallis G3CWV asked operators to look for the beacon again as it had been reported to him that someone thought they might have heard it. Soon the reports started coming in. UO-11 was back on-air, transmitting its 2 m signal a little weaker than normal and with some of the telemetry channels not operating but nonetheless "back in business". Just for old time's sake have a listen for UO-11. In the early days you needed a special demodulator and decoder but now we have software like MixW to make sense of the beacon telemetry. It will be interesting to see how long this old timer lasts and whether it can survive its next eclipse period in a few months.

PO-28 returns to the Amateur Radio Service

It was announced at the AMSAT-UK International Space Colloquium in Guildford, England by the AMSAT-UK secretary Jim Heck G3WGM that Amateurs will be getting a new satellite to use. PO-28 (POSAT-1) was launched on September 25th 1993. Its primary purpose was for commercial use on frequencies outside the Amateur bands but it also had the capability to operate on the Amateur bands. After prolonged negotiations it has been agreed that the satellite can be switched permanently to the Amateur frequencies. PO-28 (POSAT-1) was built at the University of Surrey within a collaborative program in satellite technology between a consortium of Portuguese academia and industry and the University of Surrey, managed through Surrey Satellite Technology Ltd. Here are some details:

Uplink Frequencies: 145.925 and 145.975 MHz

Downlink Frequencies: 435.075 and 435.275 MHz

Orbit : 822 x 800 km, 98.6 deg inclined, sun-synchronous.

The above news was posted to the AMSAT-BB by Trevor M5AKA towards the end of July. Since that time much discussion has taken place regarding the formats and modes of operation which would be used when the change over from commercial to amateur operation takes place. Keep an eye on the BB and on the AMSAT-NA web site for breaking news on this subject.

The AMSAT group in Australia.

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an e-mail mailing list for breaking news and such things as software releases. Contact Graham if you wish to be placed on the mailing list.

AMSAT-Australia Echolink Net.

The net meets formally on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join in and take part. Graham VK5AGR acts as net controller. The net starts at 0600UTC and you can join in by connecting to the AMSAT conference server.

All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,
9 Homer Rd,
Clarence Park, SA. 5034

Graham's e-mail address is:
vk5agr@amsat.org

SSETI Express launch date confirmed

Graham G3VZV advises that the revised launch date for SSETI Express and the other satellites on the DMC3 COSMOS launch has been confirmed as September 27th - so please keep those fingers crossed! Look at the AMSAT-UK or SSETI web sites for the latest information

More on CC Rider

The Future of Amateur Radio Satellite Transponders

AMSAT President Rick W2GPS posted the following information in answer to a question on the BB.

The Eagle C-C Rider payload is intended to be a combination of four great ideas in one project.

1. W3IWI's original C-C-Rider 5 GHz in-band transponder.
2. N4HY's Software Defined Transponder (SDT) concepts.
3. KA9Q's KarnSat digital backbone (~1Mbps).
4. WA4SIR's "IP in Space" concept.

Geoffrey (Geoff) Murray Taylor VK5TY

ETSA Technical Officer & Amateur Radio Godfather

Born: Adelaide, 18th July 1929

Died: in UK 21st June 2005

His grandfather was an Overland Telegraph Operator, his father a sheep station manager, who climbed tall towers to repair windmills. This might explain why Geoff had a lifelong affaire with climbing towers and radio communications.

Geoff lived in the same house for over 70 years, where he went to Black Forest Primary School, and graduated to the prestigious Adelaide Technical High School on North Terrace. He was accepted as a University Cadet by the Adelaide Electric Supply Company (later the Electricity Trust of South Australia, ETSA) where he worked as a Technical Officer almost 40 years until he retired early twenty years ago. At one time he was responsible for setting out powerlines along Adelaide's Marion Road with military precision. In later life he could not drive down from O'Halloran Hill towards the City at night without complaining about the "kink" in the streetlight line where the "new" railway bridge crossing Marion Road spoiled the effect.

Geoff rose to a senior position in ETSA's Test & Standards Laboratory. His official duties included apprentice training, developing his latent teaching skills, which later were to help several hundred aspiring radio amateurs (hams) qualify for their licences.

In 1959 Geoff was infected with the Amateur Radio bug and after passing his exams gained his call sign VK5ZCQ, and later passed his Morse code and upgraded to VK5TY. In 1972 he set up an amateur radio station in the Black Forest Scout Hall, and in 1973 he started the Black Forest Scout Radio Group, where his teaching prowess helped many youngsters build electrical projects and obtain their Amateur licences. He was still running highly successful classes, with students aged from 13 to 80+, thirty-five years later

Amateur radio has figured highly with Geoff being President of the State Division of the Wireless Institute of Australia from April 1972 to 1974. During this period he chaired some torrid meetings at the Master Builders' Building on South Terrace. He successfully co-opted many amateurs to renovate the Burley Griffen Incinerator at Thebarton & change it into a unique headquarters for the local Division. He represented South Australia for 13 years as a Federal Councillor and later became President of the Adelaide Hills Amateur Radio Society (AHARS), a position he held to his death, during which time he was Commissioner for Scout Radio in SA for 6 years.

Geoff was Unley Councils 2003 Citizen of the Year in recognition of services to Scouting and Amateur Radio.

In his "retirement" Geoff and his wife Christine, bought a scrub block near Swan Reach, "to get away from the phone". They personally built a two story "home from home" Wombaroo in several stages

over several years. It was an electronic marvel, powered by solar collectors, a windmill and occasionally a generator. Later they compromised their ideals and acquired a mobile phone!! It has played host to many Amateur Radio field days, outdoor film nights showing rarer old 16mm movies and hosted many visitors from home and overseas. Until recently Geoff and Christine provided a first class public address service at local events in partnership with another ex ETSA man, and could not keep up with the demand.

In March Geoff and Christine went to the UK for their long planned holiday of a lifetime, where they fulfilled dreams such as travelling through the Channel Tunnel. With the holiday almost completed Geoff unexpectedly passed away on the 21st June.

He is survived by Christine and their children Murray, Marian, Heather and Greta and nine grandchildren.

"Live as if you were to die tomorrow.
Learn as if you were to live forever."

–Mahatma Gandhi

Submitted by
Rufus VK5YO and Sandra Salaman.

AMSAT continued

The concept for this came together in a pair of "Dream Payload" meetings held in my Lab in February and May of 2004. Each of the four parts builds on the previous parts and should result in a communications mode that simultaneously allows users to operate voice, data, video, and other modes while minimising the need to track Doppler, even if fielded on a low orbit satellite. The user will only need a small antenna with single band feed, which could allow users in restricted communities to disguise the antenna as a TVRO. The low level protocols, including multi-user uplink access protocols, have not been designed yet. We are still working on the design for the RF and the electronically steered beam antenna for the satellite. The modulation will probably be BPSK. The downlink will probably be on the order of 500 kbps data rate. Uplinks will probably be about 10 kbps (effective) per channel. A lot depends on the evaluation of link budgets. If we reach this goal, the lower protocol layers will present an Application Programming Interface (API) at the IP level so any applications that are available for the Internet should work on the satellite. That includes things like EchoLink (voice), FTP, Web page servers, etc. The AMSAT community will be able to participate in the development and operation of this new concept in communications as the design will be "open source" under a GNU or GNU-like license. This includes both hardware and software. We do not expect to achieve all our goals in the first transponder implementation but we will implement the core elements of this vision. Ultimately we hope to introduce a whole new concept in open accessible satellite communications that will revolutionise the Amateur Satellite Experience.

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Technical abstracts

Peter Gibson VK3AZL

A portable inverted V antenna

In QST for June 2005, Joseph Littlepage, WE5Y describes his solution to a number of common antenna problems of today.

While it may be useful for field days, this antenna was built to solve the problems raised by moving to a neighbourhood where erection of an conventional antenna is not acceptable.

After trying a range of end-fed wires and hard-to-support dipoles, it was decided to try an inverted V, cut for 17 metres. While 17 metres is used here, any band from 20 to 10 metres can use this construction technique. The big problem was how to support the antenna in a manner that was acceptable. The final solution was to use a lightweight pushup pole, supported by a folding tripod base. The final arrangement is shown in Figure 1. In this case, the telescopic mast is a 10 metre unit from MFJ (MFJ-1910) and the support is also from MFJ (MFJ-1918) although is should be possible to source or construct suitable items locally.

The top of the antenna should bring together the feedline and the two wire elements while keeping the angle between them at least 90 degrees. Each of the wire elements is cut for ¼ wavelength on each side. The length of the horizontal supports has to be such as to hold the elements at the correct angle. An additional requirement was to be able to rotate the antenna to maximize the signal, using the 'armstrong' method.

The solution to the horizontal support problem was to use two 3 metre light weight telescoping fiberglass fishing rods, held end to end, either side of the vertical pole. The support for the fishing poles is made of two 12 inch lengths of ½ inch PVC pipe, joined to a ¾ inch PVC

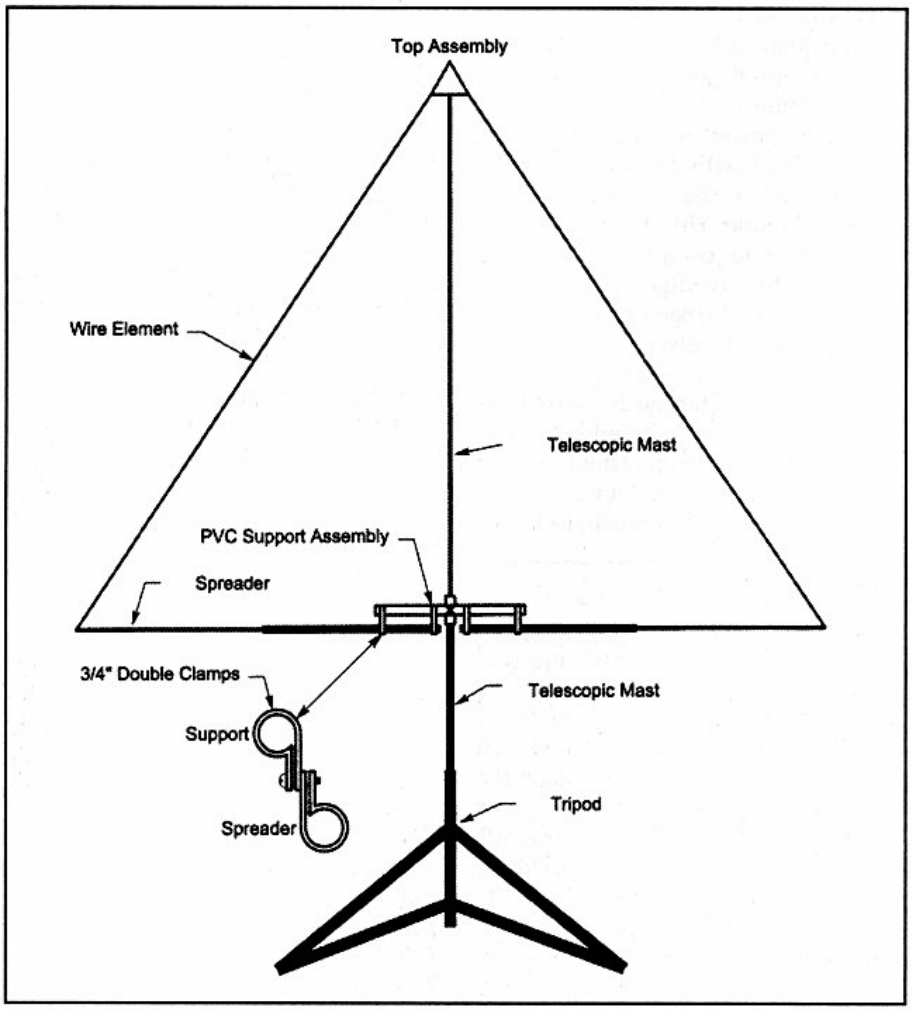

Fig 1. General arrangement of the completed inverted V antenna

'X' connector. This holds the spreaders in a horizontal position and enables them to ride up and down on the main support mast to keep tension on the elements. The horizontal assembly is shown in Figure 3. The free ends of the wire elements are attached to the eyelets on the ends of the two spreader poles.

The top assembly is required to bring the wire elements and the transmission line together as well as supporting them at the top of the mast. This assembly is constructed from 1/8 inch (or thicker) clear acrylic or similar dielectric material. Its precise dimensions are not critical. Drill holes to accommodate a top hanger, two solder lugs, a nylon cable clamp and a hole in each lower corner to support the antenna wires. Figure 2 shows the layout and relationship of all components. Neither the construction method, nor the dimensions are critical.

The spreader support assembly is made from a ¾ inch PVC X connector with ¾ to ½ inch bushings pressed into opposite side holes. The two 12 inch long support arms are pressed into the bushings. Cement all joints with PVC cement. The two remaining holes will allow the spreader to ride up and down the vertical mast. To ensure this happens, the slight raised lip inside these holes should be filed down flush with the inside surface. The two telescoping fishing poles are clamped to the 12 inch pipes as shown in figure 3.

When all of the components have been assembled it is time to string the elements. Firstly, thread the horizontal spreader down the telescoping mast. With the elements and transmission line connected to the top assembly, hook it into the top of the telescopic mast with a hook made of stiff wire (coat hanger), extending down into the tube. Then extend the mast sections, clamping them as you go until the element wires are pulled taut by the weight of the spreader. Extend the additional sections to raise the antenna as high as possible. The antenna is now ready for testing by any of the normal methods.

Note. 1 inch equals 25.4 mm

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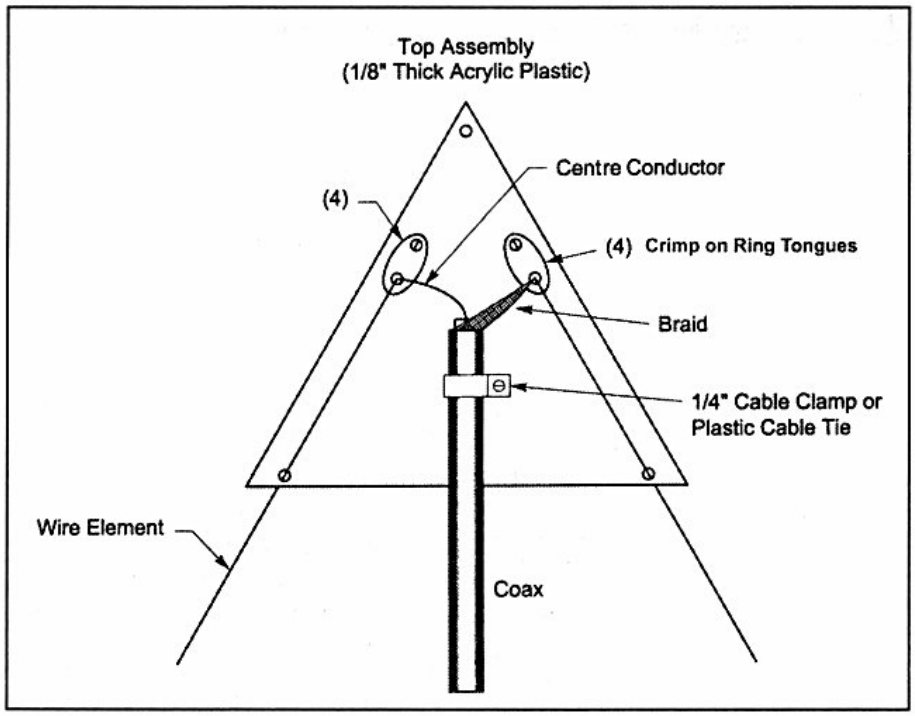


Fig 2. Details of the top assembly

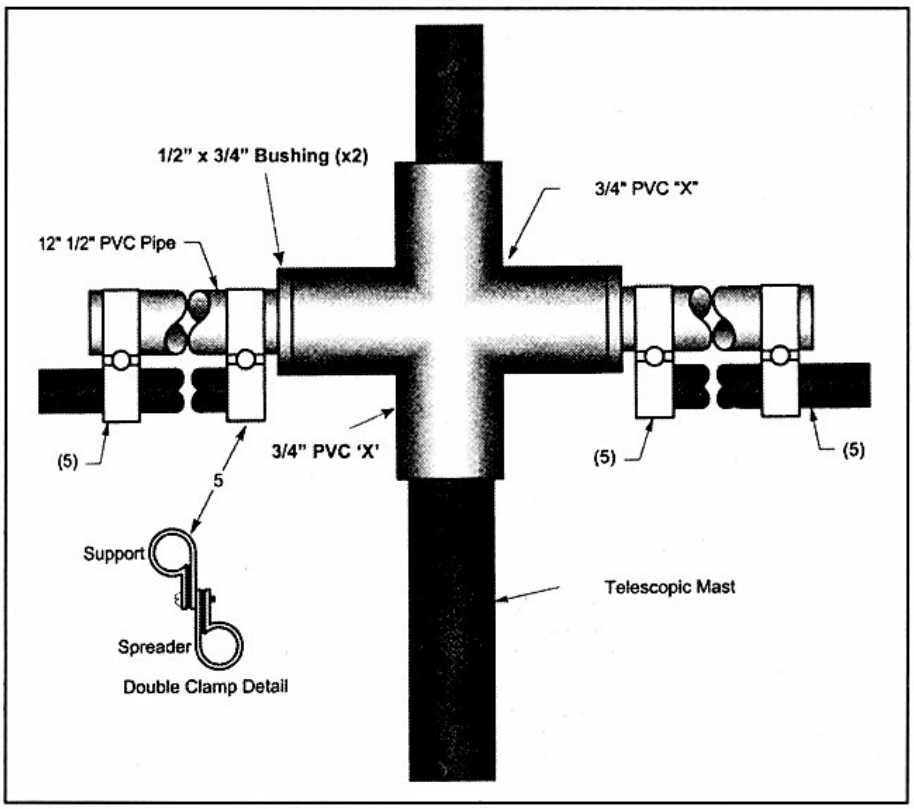


Fig 3. Details of the spreader attachment method

DX - News & Views

VK4OQ,
P.O. Box 7665, Toowoomba Mail Centre, QLD 4352.
Email: john.bazley@bigpond.com

There is no substitute for the DX activity created by CQ WW SSB and CW, taking place on the last full weekends of October and November respectively. Both of these contests regularly stimulate activity and some serious Dxpeditions to relatively rare locations, an excellent opportunity for the serious chaser of countries and IOTA islands. Most Dxpeditions usually announce beforehand whether they will be 'allband or single band' and you KNOW that they will be operating for nearly the entire contest, which should give you more than a reasonable chance of working them.

A country that has been in the 'Top Ten' wanted list for quite some time is, The Yemen.

The following was received from Vladimir Bykov, UA4WHX , (who has been very active lately operating from ST2 and J2).

"Having spent 10 days in Yemen and met a number of people responsible for issuing licences and spectrum management of Yemen Telecom as well as two deputy ministers of the Ministry of Telecommunications Information and Technology, I can probably say this:

1. Not a single amateur radio licence has been ever issued in Yemen in the past 20 years, for those interested in the authenticity of the fact I can probably provide a written statement from the Ministry confirming the fact.
2. Amateur radio has never been legalized in Yemen. Period. No legal base, no exceptions so far. But the Ministry is sincerely interested in promoting the hobby. They know about it and do plan to pass the laws for it as soon as possible.
3. When King Hussein of Jordan was here he requested a licence, which he did not get.
4. The Ministry has tried to authorize amateur radio activity in Yemen a few times but the attempts always got stuck at the Ministry of Interior offices being higher or lower.
5. What may help: write letters (when you have time) to both of those ministries, explaining: -

A. Why it is good

B. Why it is no danger to security

C. Send a bit of printed material.

Then it won't be too long before Yemen goes down to 10 least wanted.

73, Vladimir M. Bykov UA4WHX
In Sana'a, Yemen"

Now to forthcoming DX news

Four members of the Florida DXpedition Group will be in Anguilla from 25 October to 1 November, namely, Bill W4WX (VP2EWX), David WA4ET (VP2EDP), Cory N1WON (VP2ECM), and Clarence W9AAZ (VP2EAZ). Each will operate a different band during the CQ WW SSB Contest, while before and after the contest they will operate on all modes on 6-160 metres. QSL direct to home calls.

Gab HA3JB will be active again as SU8BHI from Egypt from 1st July to 31st December. He plans to operate on all bands CW, RTTY, SSTV, PSK and some SSB, and during many of the major contests. QSL direct only to HA3JB (Kutasi Gabor, P.O. Box 243, H-8601 Siofok Hungary).

WQ7R Ray, plans to be active from Honduras' Roatan Island (NA-057) between October 22nd and November 4th. Look for him probably using the call WQ7R/HR9 on RTTY, PSK and CW on HF, and possibly on CW and SSB on 6 meters. During the CQ WW SSB DX Contest he is expected to be using HQ9R. QSL via N6FF.

Members of the Korean DX Club plan to operate from both the Solomon Islands and Temotu Province in November. They will be QRV as H44HL/H40HL on 6 through 160 meters on all modes. Further details should be available next month.

N4BAA Jose, will be active from Guantanamo Bay (Gitmo) during the CQWW SSB Contest in October. His callsign will probably be either KG4WV or KG4SB. Jose will be QRV starting Tuesday before the contest until Tuesday or Saturday afterward. He will be 160-6M all modes with a heavy emphasis on CW. January 2006 he also plans a KG4SB or KG4WV operation concentrating on the low bands, this will be a 10-14 day operation. For both operations QSL via N4BAA.

W1DV/TL8DV, Dave, is expected to soon be QRV again from the Central African Republic. He'll probably be there for several weeks working on construction of a new orphanage. QSL via W3MC.

A35BO, Tonga, will be on the air October 24th to December 1st, with Alex, HB9FBO operating. He will be on 160-10M including the WARC bands, CW, SSB, and PSK31.

HI3CCP will be on from the Dominican Republic in the CQWW SSB October 29-30. The Lomadeltoro Contest Team, HI3CCP, HI3TEJ, HI3NR and HI8ROX will be on the air as a multiop. QSL via ON4IQ.

OK1LO, Lada, will be heading back to Iran in September. He plans to take a vertical antenna (10, 15, 20 metres) for the EP3PTT club station and he also wants to install an 80 metre sloper.

More information is now available on the planned trip to East Kiribati T32 that I mentioned last month. It is planned to operate from two new IOTA islands. The first will be Flint Island and if they are unable to land there they will try Vostok Island. The other will be Millenium Island. The operators will be T32Y (Nando IT9YRE), T32SNW (Claudio I1SNW) and T32EJW (Alfio IT9EJW).

QSL to the individual operators T32Y Fernando Rubino, PO Box 30, 96012 – Avola (SR) – Sicily, Italy T32SNW Cláudio Scaglia, PO Box 161, 14100 – Asti (AT), Italy and for T32EJW Álfio Bonano, PO Box 18, 95028 – Valverde (CA), Italy

An operation from Cambodia is planned by Jacques ON4AJV and Willem ON6TZ from 30th October to 10th November on all HF bands - SSB and CW with the callsign XU7TAS. QSLs should be directed via ON4AJV – Jacque Vandenabeele, Tem Poele 36,8430, Midddelkerke, Belgium.

So that about 'wraps up ' this month. Comments please by the 8th October for November *Amateur Radio*.

Special thanks to the authors of *The Daily DX* (W3UR) - 425 *Dx News* (I1JQJ) and QTC DX PY2AA for information appearing in this month's *DX News & Views*. Interested readers can obtain from W3UR a free two week trial www.dailydx. com/order.htm **ar**

Contests

Ian Godsil VK3JS
WIA Federal Contests Co-ordinator

Contest Calendar September - November 2005

Sep	**3**	**Russian Radio RTTY Contest**	**(RTTY)**
	3/4	**All Asian DX Contest**	**(SSB)**
	10/11	**Worked All Europe DX Contest**	**(SSB)**
	24/25	**CQ WW RTTY DX Contest**	**(RTTY)**
Oct	**1**	**PSK31 Rumble**	**(PSK)**
	1/2	**Oceania DX Contest**	**(SSB)**
	8/9	**Oceania DX Contest**	**(CW)**
	10	**10-10 International Day Sprint**	**(All Modes)**
	15/16	**JARTS WW RTTY Contest**	**(RTTY)**
	16	**Asia-Pacific Sprint Contest**	**(CW)**
	16	**RSGB 21/28 MHz Contest**	**(CW)**
	29/30	**CQ WW DX Contest**	**(SSB)**
Nov	**12/13**	**Japan Intl. DX Contest**	**(SSB)**
	12/13	**Worked All Europe DX Contest**	**(RTTY)**
	26/27	**CQ WW DX Contest**	**(CW)**

Greetings to all Readers

One of the things about writing articles like this is that you get to think in advance. As I begin these notes the RD has not yet happened; but by the time you read them it will be all over.

Now that we have experienced the new Rules, it would be a good time to ask for opinions about all aspects of the contest. As I wrote last month, one revision may not be enough.

I take this opportunity to invite comments from anyone on how they found this year's Remembrance Day Contest, eg did the changes of rules induce you to operate in the early hours of Sunday morning in order to get bonus points? Were you enticed to try UHF+ ? Were you enticed to try different modes on the same band?

Two things I would like to throw in to start discussions

1. I hope that we shall always remember that this is a MEMORIAL contest, to honour those who served and died in conflicts of war. In this sense it is the Diggers' Contest, even though there be few original Diggers left these days and most of those are not Amateur Radio Operators.

   On this basis it could be argued that CW should be almost the exclusive mode for the event, as that was still dominant in WW2. Even a dedicated CWer like me will recognize the stupidity of that argument in the light of today's plethora of modes.

   However, it is a contest with a purpose outside making contacts to win. We need to keep it "friendly", but I still make no apologies for opposing the idea of using contacts as an opportunity to catch up with old friends once a year!
2. In this day and age I suggest that there is no valid reason for contesters NOT to use logging programs of one type or another. I know that the RD in particular presents problems with scoring by having bonuses, points dependent on distance, etc. However, there are chaps out there who are well able to devise some sort of electronic scoring system. Two that come to mind particularly are Alan VK4SN and Mike VK3AVV. Mike has a traditional-style logger that can cover several VK contests, while Alan has an excellent "auto-scorer" for the VK/trans-Tasman Contests. Perhaps these two operators can redesign their programs to cope with the new RD scoring system, albeit with some external input from us after the contest in order to cope with bonus points.

Either way, I would like to challenge skilled programmers to devise a suitable logger to cope with VK contests.

Simple Logging

Even if there is not a fully-fledged logger for VK contests in its own right, there really is no excuse for not using your computer for even simple logging. Almost all of us today will have one or more computers in our shacks. If we only use them as glorified typewriters, then we seriously undervalue the ability of the machine and ourselves to learn new skills.

Lest you say "I can't type fast enough", the answer is PRACTICE. When you learnt Morse and Theory, you practised until you became proficient. So with typing. There are tutoring programs and good books to guide you to using ALL fingers. I agree, two fingers are a drawback, ten are not!

The simplest form of logging is just a blank page with spaces for entering QSOs (see fig. 1). It is not hard to learn to enter the basic contact information

as you go along, ie name of station and exchange. Scoring can be done after the event. The important thing is that the vital information is already in your computer, not spread over pieces of paper. Also, this document is a text document, easily readable by any computer. More ambitious programs may need other help to make them work properly.

Later, how easy it is to list all relevant information onto a Summary Sheet (see fig. 2).

Thus you have done what the rules ask by submitting your Log and Summary Sheet and it has not taken you nearly so long to finish it all.

As I said, this is simple logging. It can be practised before next year. Then, the more adventurous amongst you will harness the power of a spreadsheet to achieve the same effect, with the added bonus of the scoring happening as you go – more like a traditional logging program.

Summary

My thrust now is to encourage Australian contestants to make use of computerized logging as a normal and automatic form. Also, to encourage debate and discussion on the future of contesting in Austalia. You may remember that in June I suggested that if we are not more active then there may not be any contests or AR by the end of the next decade.

I have received a most interesting letter from Ernie VK3CEW with his thoughts on contesting in VK. Next month I shall continue this theme by quoting from his letter. In the meanwhile, please have a think about what is written here and let me have your thoughts. You may email me at vk3js@vkham.com or write QTHR.

73 and good contesting,

Ian Godsil VK3JS,

CONTEST LOG SHEET Page:

CONTEST NAME:

DATE:

CATEGORY: SINGLE OPERATOR
SECTION: PHONE CW MIXED

STATION: VK3JS/QRP

TIME UTC	STATION WORKED	BAND	MODE	RST	RST SENT	MULT RCVD	POINTS

TOTALS:

TOTAL POINTS CLAIMED THIS PAGE:

Fig 1

SUMMARY SHEET

CONTEST NAME:

DATE:

STATION:

OPERATOR:

CATEGORY: SINGLE OPERATOR

SECTION: CW PHONE MIXED

LOCATION:

SCORE SUMMARY: contacts
multipliers X points

CLAIMED SCORE: **POINTS**

EQUIPMENT:

DECLARATION: I hereby state that I have operated in accordance with the rules and spirit of the Contest and have observed all Radio regulations.

Signed.....

Comments:

Fig 2

Plan ahead for October

Oceania DX Contest 2005 : (SSB) 1 – 2 October, (CW) 8 – 9 October

2004 Oceania DX Contest Results

1. Introduction

Congratulations to all the winners in the 2004 Oceania DX Contest, and especially VK6DXI who ended up winning the Oceania Single-Op All Band category in both the PHONE and CW sections.

Overall activity was similar to that experienced in 2003, despite the 10 cm solar flux index dropping from around 110 during the 2003 contest to 90 in the 2004 contest.

Compared to 2003, there was around a 21% increase in the number of logs submitted. The increase in participation appears to have offset the impact of any decline in conditions on the higher HF bands. The increased interest is encouraging and indicates that the contest is in good health.

2. PHONE Results

The leading stations and top scores for the PHONE section are summarised in Tables 1, 2 and 3 below. The full results are presented in Annex 1, along with soapbox comments and equipment/antenna information in Annexes 3 and 4.

VK6DXI leads the Oceania Single-Op All Band category with a score of 1,827,868. VK2APG is not far behind with a score of 1,657,200 and 9M6A (op G4MJS) in East Malaysia is in third place with a score of 1,081,752. The top entrants from other Oceania countries in the Single-Op All Band category are ZL2UO (New Zealand), WH2V (Guam), DU7MHA (Philippines) and YB4IR (Indonesia).

The ZL6QH team at the Quartz Hill club station was the only station in the Multi-Multi category and achieved a score of 3,682,636. ZL4AA takes the top position in the Oceania Multi-One category with a score of 828,768, but is closely followed by ZL1AA with a score of 827,931.

An entry of note is YC3BDJ who entered the Single-Op 15m category to achieve the highest score in Indonesia, as well as 10th position overall in Oceania.

Category	Asia	Europe	North America	Oceania	South America
SWL ALL	UA0-107-181	LZ2F-319		ZL2001SWL	
SINGLE-OP ALL	JH4UYB	ER1Q	K3ZO	VK6DXI	LU2NI
SINGLE-OP 80M	RA0BA		W7AV	VK2HPM	
SINGLE-OP 40M	JR9NVB	PA7A		YB2OK	
SINGLE-OP 20M	JA6GCE	RA6DB	N4MM	YB0A	PY3YD
SINGLE-OP 15M	JF3BFS	OZ1ADL	W7KPL	YC3BDJ	PT2ND
SINGLE-OP 10M	JA2MWV				
MULTI-ONE	RK9CWA	9A4P		ZL4AA	CE2RLS
MULTI-MULTI				ZL6QH	

Table 1: Continent Winners in PHONE Section

Callsign	Category	Score
ZL6QH	MULTI-MULTI	3682636
VK6DXI	SINGLE-OP ALL	1827868
VK2APG	SINGLE-OP ALL	1657200
9M6A	SINGLE-OP ALL	1081752
ZL4AA	MULTI-ONE	828768
ZL1AA	MULTI-ONE	827931
VI6175WA	MULTI-ONE	774364
ZL2UO	SINGLE-OP ALL	693048
WH2V	SINGLE-OP ALL	629926
YC3BDJ	SINGLE-OP 15M	593328

Table 2: Top Ten Oceania Stations in PHONE Section

Callsign	Category	Score
JH4UYB	SINGLE-OP ALL	59220
RZ3BY/0	SINGLE-OP ALL	32072
ER1Q	SINGLE-OP ALL	17984
RW0CF	SINGLE-OP ALL	16120
RD3A	SINGLE-OP ALL	15435
RW0AR	SINGLE-OP ALL	11988
UT2IY	SINGLE-OP ALL	11776
LZ2F-319	SWL ALL	10731
JA7ODY	SINGLE-OP ALL	8904
7S2E	SINGLE-OP ALL	8901

Table 3: Top Ten Non-Oceania Stations in PHONE Section

JH4UYB again takes the top position outside Oceania with a score of 59,220. Second place goes to another Asian station, RZ3BY/0, with a score of 32,072. ER1Q is the highest European station and achieves third place overall with a score of 17,984. The top entrant from North America is K3ZO, a long time supporter of the contest, and the top entrant from South America is LU2NI.

3. CW Results

The leading stations and top scores for the CW section are summarised in Tables 4, 5 and 6 below. The full results are presented in Annex 2, along with soapbox comments and equipment/antenna information in Annexes 3 and 4.

The top station in the Oceania Single-OP All Band category is VK6DXI from Western Australia with a score of 3,490,290. VK4EMM went portable this year to take second position with a score of 3,457,776. Third position goes to ZL1TM in Auckland with a score of 1,813,784. The top entrants from other countries in the Single-Op All Band category are YB0DPO (Indonesia), YJ0AX (Vanuatu), and DU7MHA (the Philippines).

The only Oceania entrant in the Multi-Multi category was ZL6QH with a score of 6,805,017. First place in the Oceania Multi-Single category goes to ZM1A with a score of 3,594,864.

Category	Asia	Europe	North America	Oceania	South America
SWL ALL	UA0-107-181	LZ2F-166			
SINGLE-OP ALL	JG1IGX	LY3UM	N6RO	VK6DXI	LU1EWL
SINGLE-OP 80M	JM1NKT				
SINGLE-OP 40M	JA1PS	SP4DEU	W7DRA		
SINGLE-OP 20M	RW0AR	RA6DB		VK4BUI	
SINGLE-OP 15M	RW0LIA	UA3DEE	N4MM	YB0WWW	PY7GK
SINGLE-OP 10M	7K2PBB	ES1QD	K2EKM	VK2CZ	
MULTI-ONE	RK9JWV	RK3SWB		ZM1A	
MULTI-MULTI	RK0LWW			ZL6QH	

Table 4: Continent Winners in CW Section

Callsign	Category	Score
ZL6QH	MULTI-MULTI	6805017
ZM1A	MULTI-ONE	3594864
VK6DXI	SINGLE-OP ALL	3490290
VK4EMM	SINGLE-OP ALL	3457776

ZL1TM	SINGLE-OP ALL	1813784
ZL4AA	MULTI-ONE	1042074
VK4AN	SINGLE-OP ALL	969088
YB0DPO	SINGLE-OP ALL	784096
VK4TT	SINGLE-OP ALL	782856
VK2KM	SINGLE-OP ALL	711970

Table 5: Top Ten Oceania Stations in CW Section

Callsign	Category	Score
N6RO	SINGLE-OP ALL	33984
JG1IGX	SINGLE-OP ALL	15568
UA0CA	SINGLE-OP ALL	15498
LY3UM	SINGLE-OP ALL	11450
UA9PC	SINGLE-OP ALL	11124
KM4M	SINGLE-OP ALL	9417
RD3A	SINGLE-OP ALL	9016
UA0SC	SINGLE-OP ALL	8256
UA0LCZ	SINGLE-OP ALL	7360
RV4LC	SINGLE-OP ALL	7310

Table 6: Top Ten Non-Oceania Stations in CW Section

Outside Oceania, N6RO is the clear leader in the Single-Op All Band category with a score of 33,984. JG1IGX is in second place with a score of 15,568 and UA0CA is close behind in third place with a score of 15,498. The top entrant from Europe is LY3UM and the top entrant from South America is LU1EWL.

4. Awards

The recipients of trophies and plaques for the 2004 contest are listed in Table 7. Certificates will be awarded to the top scoring station in each category for each continent and country, subject to the station having made at least ten QSOs.

The Contest Committee is still working on a new design for the contest plaques and certificates. The intention is to apply this new design to the 2004 plaques, as well as the plaques that are still to be distributed for the 2001, 2002 and 2003 contests.

AWARD	DESCRIPTION	RECIPIENT
ZL2TT Memorial Trophy	Top entrant from Oceania in Single Operator All Band PHONE category - Ron Wills, ZL2TT Memorial trophy sponsored by ZL2GI, ZL2AL, Wellington Amateur Radio Club and NZART.	VK6DXI
Oceania Single-Op ALL Band CW Plaque	Top entrant from Oceania in the Single Operator ALL Band Category	VK6DXI
VK2QL Memorial Trophy	Top entrant from VK in Single Operator All Band CW category - Frank Hine, VK2QL Memorial trophy sponsored by WIA Federal.	VK6DXI
VK5/VK8 Single-Op ALL Band PHONE Plaque	Top entrant from VK5 or VK8 Call areas in Single Operator All Band PHONE category - Plaque sponsored by WIA South Australian Division	VK8HPB
VK5/VK8 Single-Op ALL Band CW Plaque	Top entrant from VK5 or VK8 Call area in Single Operator All Band CW category - Plaque sponsored by WIA South Australian Division	VK8AV
VK7 Single-Op ALL Band PHONE Plaque	Top entrant from VK7 Call area in Single Operator All Band PHONE category - Plaque sponsored by WIA Tasmanian Division	VK7VH
VK7 Single-Op ALL Band CW Plaque	Top entrant from VK7 Call area in Single Operator All Band CW category - Plaque sponsored by WIA Tasmanian Division	VK7GN
ASIA Single-Op ALL Band PHONE Plaque	Top Entrant from Asia in Single Operator All Band PHONE category - Plaque sponsored by Australia Eastern Mountain and Districts Radio Club	JH4UYB
ASIA Single-Op ALL Band CW Plaque	Top Entrant from Asia for Single Operator All Band CW category - Plaque sponsored by Australia Eastern Mountain and Districts Radio Club	JG1IGX
NORTH AMERICA Single-Op ALL Band PHONE Plaque	Top Entrant from North America in Single Operator All Band PHONE category - Plaque sponsored by N6RO	K3ZO

Table 7: 2004 Trophy and Plaque Winners

5. Conditions

The 10cm solar flux index for the 2004 contest was around 90, compared to around 110 for the 2003 contest. Despite the reduced flux index, Charts 1 and 2 below show that the overall level of activity is similar to that experienced in 2003. The greater number of participants in the 2004 contest appears to have offset any decline in HF propagation.

Inspection of the charts shows that all of the bands between 40m and 10m were in good shape for the CW weekend, but only the 20M and 15M bands delivered much action during the PHONE weekend. There was very little activity on 80M and only a few QSOs on 160M - one of the future challenges is to encourage more activity on these bands.

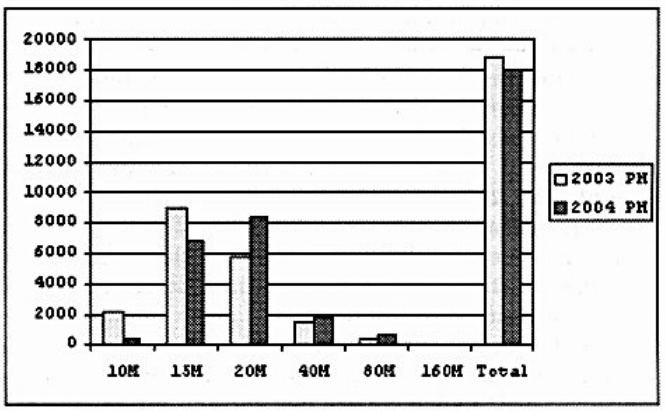


Chart 1: Number of QSOs in Oceania PHONE Logs

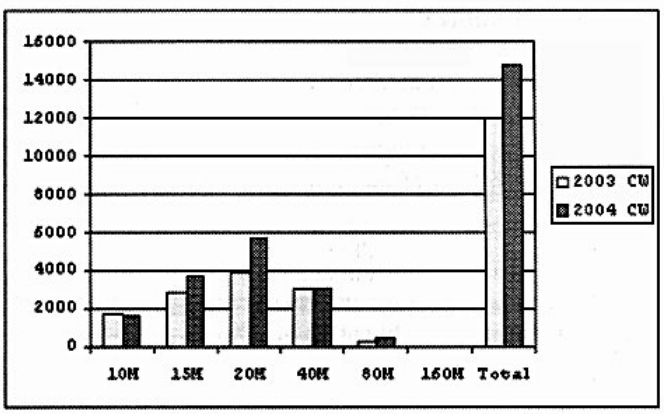


Chart 2: Number of QSOs in Oceania CW Logs

6. Participation

Chart 3 shows the trend in the number of logs submitted (including check logs) since 2000. Tables 8 and 9 provide a breakdown by continent.

The number of logs submitted has more than doubled over the period shown and there was a 21% increase between 2003 and 2004. Most of the additional logs are from Europe, with 53% of the logs coming from this continent in 2004.

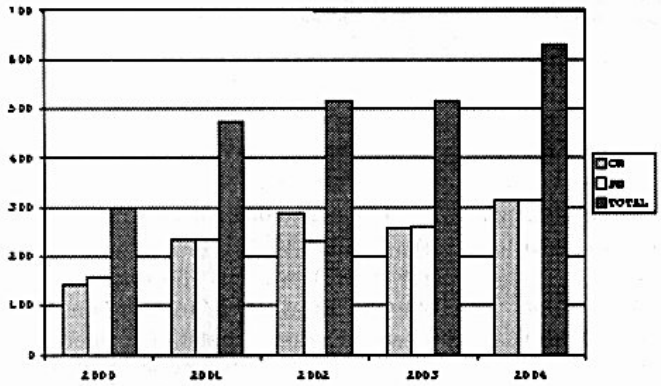


Chart 3: Number of Logs Submitted (including check logs)

Year	Africa	Asia	Europe	North America	Oceania	South America	Total
2000 PH	0	46	72	10	28	2	158
2001 PH	0	70	110	10	42	5	237
2002 PH	0	75	95	11	44	4	229
2003 PH	1	90	110	12	42	6	261
2004 PH	0	88	149	12	59	5	313

Table 8: number of logs received for PHONE section

Year	Africa	Asia	Europe	North America	Oceania	South America	Total
2000 CW	0	52	64	10	15	2	143
2001 CW	0	57	133	17	27	2	236
2002 CW	0	59	164	24	34	6	287
2003 CW	0	71	138	21	23	3	256
2004 CW	0	79	183	22	27	4	315

Table 9: number of logs received for CW section

The upward trend in participation over the period 2000 to 2004 can be attributed to the ongoing efforts of the new joint VK/ZL management committee that was established in 2001. Initiatives undertaken by the Committee to rejuvenate the contest have included:

- the establishment of a new series of awards;
- the introduction of a revised set of rules;
- wider promotion of the contest including the establishment of www.oceaniadxcontest.com web pages; and
- the introduction of comprehensive log checking and results reporting.

There are still plenty of opportunities for improvements to further encourage participation in the contest. In particular we want to continue improving the log checking process so that there is a more timely publication of results and distribution of awards.

7. Log Checking

The Committee is pleased to note the increasing use of email for the submission of logs - 82% of the 2004 logs were delivered this way, compared to 79% in 2003 and 57% in 2001. Unfortunately, many of the email logs are not presented in the required Cabrillo format and require significant reformatting before they can be checked. To address this issue the Committee is investigating the use of an email robot for the 2005 contest. The robot would automatically check the formatting of logs as they are submitted and request logs to be resubmitted if they do not meet the specified format.

The scores of some of the 2004 SWL entries are substantially less than the claimed scores. In most cases this was due to duplicates being ignored or violations of Rule 11 which states "The same callsign may appear only once in any group of 3 consecutive entries in the 'station being worked' column".

8. 2005 Contest

The 69th Oceania DX contest will be held on the first two weekends of October 2005 as follows:

PHONE Section:	0800 UTC Saturday 1 October to 0800 UTC Sunday 2 October
CW Section:	0800 UTC Saturday 8 October to 0800 UTC Sunday 9 October

9. More Information

Further information about the 2004 results (including soapbox comments and station equipment/antenna lists) and the full rules for the 2005 contest are available from the Oceania DX Contest web site at www.oceaniadxcontest.com

10. Thank You!

Thank you to the members of the Oceania DX Contest Committee and the additional log checking volunteers (ZL1CT and ZL2AOH) who managed the various tasks for the 2004 contest - a huge effort involving around 200 person hours. We also gratefully acknowledge the financial support provided by NZART, WIA and the sponsors of awards.

Most importantly, thank you to everyone who participated in the 2004 contest and made it such a success. We look forward to seeing everyone again, along with new entrants, in the 2005 event. Let's hope for some good conditions and make it the biggest and best Oceania DX Contest ever!

73 from

Oceania DX Contest Committee (ZL1AZE, ZL2BSJ, ZL3GA, VK1JDX, VK2AYD, VK2CZ, VK2FHN, VK3TZ, and VK4EMM)

VHF/UHF - an expanding world

David Smith VK3HZ - vk3hz@wia.org.au
Leigh Rainbird VK2KRR - vk2krr@wia.org.au

Weak signal

David Smith - VK3HZ

On July 21st, we again saw a similar opening to the one reported in the last column, where an intense high pressure cell floated across the south of the country. Stations heard include VK5's PO, ZLX, AKK, NY, ZK, DK and JL and VK3's AFW, AXH and HZ. At this location, Roger VK5NY on 70 cm reached S9 + 20 dB on my (recently calibrated) "S" meter. Signals from all stations were over S9 on 2 m.

The Gridsquares League Table is a competition hosted by the NSW VHF DX Group and maintained by Guy VK2KU. In the past, this table has been restricted to VK stations only. Guy has recently decided to allow ZL stations to be listed as well. The latest table has just been released (see August AR) and is updated approximately every 3 months. So, hopefully the next update should see a few new callsigns from across the pond competing with the locals.

On August 7th, a new Region 1 record was set for the 2 m band. A large tropo opening over the Atlantic allowed Tim G4LOH to work RW1ZC/MM who was operating from a fishing trawler off the coast of Mauritania. Total distance was 3493 km. Several contacts were had over several hours with signals reaching S7.

This new record prompts me to think that there are only four things needed for such a contact - you need to be on air, the band needs to be open, there needs to be another station located at the other end of the opening and that station needs to be on. Fairly simple really! Perhaps we need to encourage Russian fishing trawlers with active 2 m stations onboard to operate in the Indian Ocean off the southern tip of WA.

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

Digital DX modes

Rex Moncur - VK7MO

Welcome to Peter VK5ZPG at Quorn near Port Augusta, Grid locator PF97aq, who is operational on FSK441 on two metres and participating in the Weekend Activity Sessions. Wayne, VK4WS, has his station going well and completed two metre contacts with three VK3s, as well as VK5 and VK7 in one session.

It is often useful during the FSK441 Activity Sessions to send reports to two stations and the following procedure, which shows the progress of two contacts from the perspective of VK3HY, has been adopted:

VK2AWD/27 VK4WS/R36 VK3HY
AWD/RRR 4WS/73 VK3HY
AWD/73 VK3HY

Note that the call sign of the other station is abbreviated only after full call signs have been exchanged so as to meet the requirements for a valid QSO. In using this procedure one will often need to send more characters than are visible in a WSJT text box, but it is possible to send more characters by typing the full line you wish to send in any box and the first part will just run off the front of the text box.

Send Digital DX Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

The Magic Band - 6 m DX

Brian Cleland - VK5UBC

Firstly some beacon news. Jack VK2XQ reports the Sydney beacon VK2RSY is back on air on the new frequency of 50.289 MHz. It is running 12 watts to a horizontal dipole at approx six metres, CW mode and transmission is "VK2RSY QF56mh". Reports are welcome at vk2wi@ozemail.com.au.

John VK4FNQ reports that the Townsville beacon VK4RTL on 50.087 MHz, which was being tested from a private residence, has now been located at the club site on Mt Stuart at 584 meters ASL.

John VK4FNQ at Charters Towers reports a good opening on the 23rd July to an area between mid NSW and northern Victoria when he worked several stations including 5 x VK2, 2 x VK1 and 2 x VK3 all at S9. John also reports hearing the FK8 beacon on the 23rd & 25th July, the VK2RHV beacon on the 19th, 23rd & 26 July and the ZL TV on the 23rd July.

Norm VK3DUT reports hearing ZL TV and the ZL3 and FK8 beacons quite often during July and on the 3rd July worked ZL3AAU & ZL3MF, 9th July ZL4LV & ZL3FV, 17th July ZL3MF, ZL3TY & ZL4LV and on the18th July ZL3TY.

Dave, a SWL from Adelaide, reports hearing the following in July:

July 3rd 50.047 VK8RAS/b 0310-0314 UTC 559.

July12th, 50.058 VK4RGG/b 0724-0738 UTC 539 and 0757 UTC 439, 50.288 VK2RHV/b 0725-0735 UTC 549 and 0802-0835 UTC 439, 50.297 VK7RST/b 0726-0740 UTC 559, 50.110 VK4WS 5x4 working VK5RO 0731 UTC.

July13th, 50.047 VK8RAS/b 0727-0805 UTC 569.

July17th, 50.110 0316 UTC VK2XQ 5x6, 50.110 0324 UTC VK2BZE 5x6.

Leigh VK2KRR reports that on the 17th of July there was an Es opening just after lunch when he began hearing the 50.297 beacon from Hobart and then worked Wayne VK4WS on 50.110. Leigh was also hearing the Gold Coast beacon VK4RGG on 50.058. Then on 20th July he reports the Toowoomba TV video on 46MHz was audible just after midnight for an hour.

Please remember to send any 6m information to Brian VK5UBC at bcleland@picknowl.com.au.

2 m & 70 cm FM DX

Leigh Rainbird - VK2KRR

This month, 2 & 70 FM DX Outstanding Achiever for season 04 / 05, also the July DX report where we had two good duct openings in the southeast.

Mike VK4MIK from Butchers Creek on the Atherton Tablelands of Queensland is awarded the 2 & 70 FM DX Outstanding Achiever award for 2004/2005.

Not only was Mike consistent in sending in reports of all DX in north Queensland for the whole season, but he was involved in some of the longest contacts of the season, thereby achieving his goal of breaking the 1000 km barrier. Mike also became involved in the 70 cm band and currently holds a number of spots on the ANVDG records list.

Mike's magic contacts for the season occurred on 25th October when he was able to work a number of 2 m repeaters in excess of 1000 km on tropo. These were Gympie at 1231 km; Hervey Bay at 1151 km and Bundaberg at 1118 km. Well done Mike, wonder what your next DX goals will be?

There were two good duct openings in the southeast for July, the first occurring on 04/07. Mount Gambier beacons were heard here, but no reports of any FM contacts being made.

The second duct opening was much better and occurred in the evening of the 20th and morning of 21st July. Good signals this time from Mount Gambier, Adelaide, Mildura and Broken Hill beacons up to 1296 MHz.

John VK5NJ from Mt Gambier was heard working into the Mt Macedon repeater VK3RMM. Shane VK5NRV at Woodside and Barry VK5KCX at Gawler made it to the Shepparton repeater VK3RGV, which is over 600 km.

John VK5PO from Eden Valley made it to a number of VK3 repeaters, which included Mt Tassie at 786 km, Shepparton at 642 km, Otway Ranges at 605 km and Mt Macedon at 579 km.

Keep an ear out on 146.875 MHz as I am informed the Murray Bridge repeater VK5RMB has been resurrected. VK5RMB was one of the best repeaters in South Australia and has been off air for at least 6 months. Let's hope it's running as well as before. Thanks to all those involved in its repair.

I occasionally receive reports of illegal operation on the 2 and 70 cm bands. If you do hear illegal operators or any other operation that causes unnecessary interference on 2 m or 70 cm bands please send me a message via email.

Please remember to send through any 2 and 70 FM DX reports to Leigh VK2KRR at vk2krr@wia.org.au

ANVDG Long Distance Competition

The 2005/2006 Australian National VHF DX Group's Long Distance Competition will encourage activity, improve station efficiency, design and performance, and raise awareness of propagation on bands from 144 MHz to 10 GHz.

This competition was thought up by Leigh VK2KRR, based on the group's National Records Table, but runs over a 12 month DX season, from July 1st to June 30th. The ANVDG 2005/2006 Long Distance Competition, if a success, could run each season.

So, unlike the ANVDG National records where you'll be very hard pushed to exceed many of the records and where people think "I have been there and done that so there is no point trying", with the yearly competition you have to get out there and do it all again!

The good thing is that on 1st July at the start of the new season, even a 1 km contact on any band could be the current record, until, of course, someone works 2 km! Be interesting to see the progress and highlights as the season unfolds.

For operators wishing to take part in the competition, send info of relevant contacts to the group email anvdg@bigpond.com with the subject of Long Distance Comp. Include as much detail about the contacts as you like, but you must submit: Your details including your name, callsign, town or locality and grid square, claimed distance, other stations name, callsign, town or locality and or grid square, date of contact.

Each different band is listed separately. There are a number of different categories based on the propagation involved with the top 4 distances listed for each. There are separate listings for each call area from VK 1 to 8. Top 4 National records are listed for each category and band.

The Long Distance Competition table and other information can be viewed at http://www.users.bigpond.com/anvdg/Longdistancecompetition0506.htm

ar

The development of radios in the Flying Doctor Service

Rodney Champness VK3UG

In my first article on the development of radio for the flying doctor service ("Amateur Radio" March 2002), I brought you up to the time when the pedal radio prototype had been developed. Alf Traeger with considerable help from his mentor Harry Kauper had finally cracked the seemingly insurmountable problem of developing a simple portable HF radio transmitter/receiver for use in the outback. Now it is time to take you further along this development path. Note that I said "transmitter-receiver", as the receiver and transmitter were separate entities that happened to be in the same case. The art of developing a transceiver, where the transmitter and receiver share a considerable amount of the circuitry did not appear until many years later.

Alf Traeger with the original "Pedal Radio", November 1928.

The "baby" transceiver

Preliminary details of the "baby" transceiver were given in the first article and more complete specifications can now be given. The word "baby" came as a result of Rev. John Flynn's discussions with radio experimenters. He needed a "mother" station (base station) which looked after a number of "baby" stations (homestead portable stations).

The "baby" was a three valve unit. It had a one valve crystal locked Morse code (CW) transmitter using a B205 valve with an output power of around 1.5 watts on a frequency of 2230 kHz (as shown on the licence). The filament voltage was supplied from two No 6 cells in series, with a rheostat to reduce the voltage to 2 volts at the valve. The high voltage was supplied from the pedal generator (the Mk1 version). This supplied between 160 and 180 volts DC to the plate of the valve under load.

The Mk1 and Mk11 have operating output voltages no higher than 220 volts with normal pedalling. This has been confirmed by tests on pedal generators, and by referring to some of the very early circuit diagrams. Some texts state that the pedal generator supplied 350 volts or so. This is not so, as the valves in this model and later models were rated with maximum design voltages of 135 to 180 volts. The application of 350 volts would have resulted in a spectacular valve failure within seconds of the application of 350 volts!

The radiating system consisted of a quarter wave Marconi aerial/antenna nominally 60 feet (18.3 m) high, and about 105 foot (32 metres) long, fed against a quarter wave counterpoise. The radiating system was tuned by manually adjusting the length of the aerial and counterpoise. This was a laborious task. Traeger allowed 10 to 14 days to fully install one of these "baby" sets and to train the operator in both how to use the set and to send Morse code. The need to receive Morse was not of paramount importance, as the base station operator always transmitted by voice to the out-stations.

High voltage (45 or 60 volt) dry batteries of that era (1928) had rather poor leakage characteristics in tropical climates and would go flat rather quickly. Harry Kauper had experimented with Philips A141 valves, which only required between 2 and 20 volts to operate effectively. Kauper and Alf Traeger came to the conclusion that these valves would be satisfactory in the receiver and the low voltage batteries

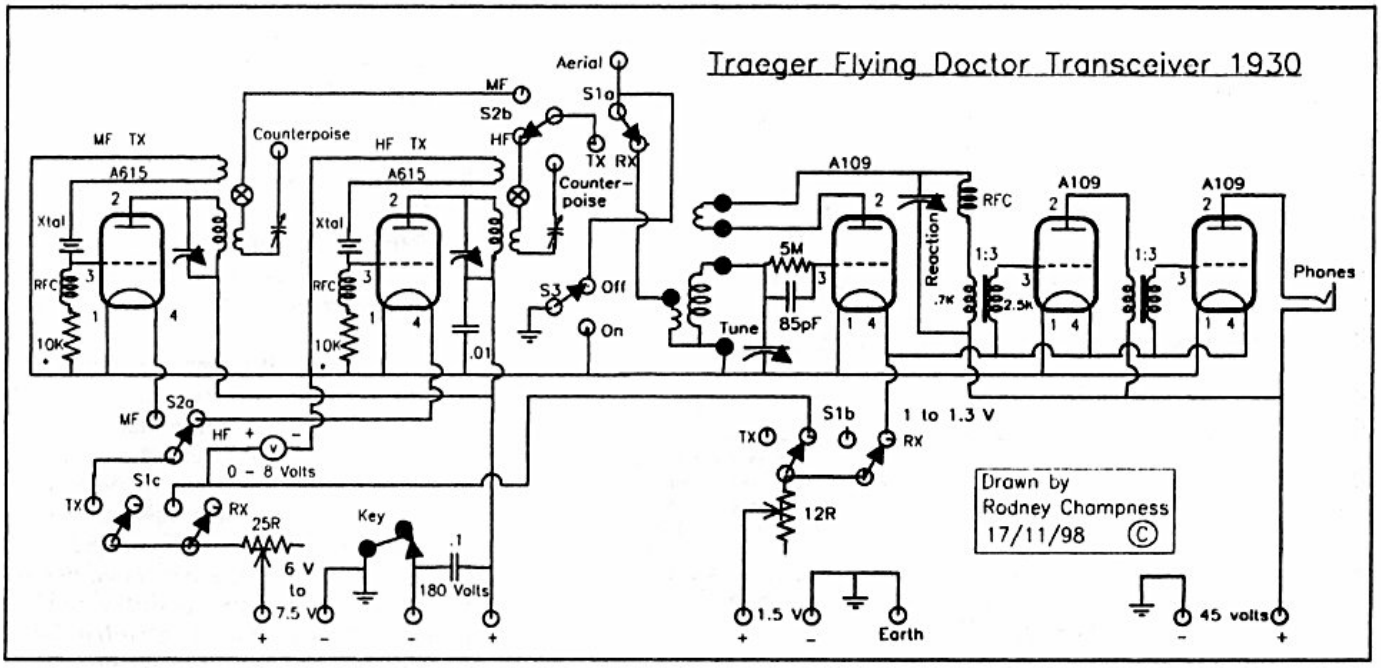


Fig 1. Circuit of the 1930 RFDS radio.

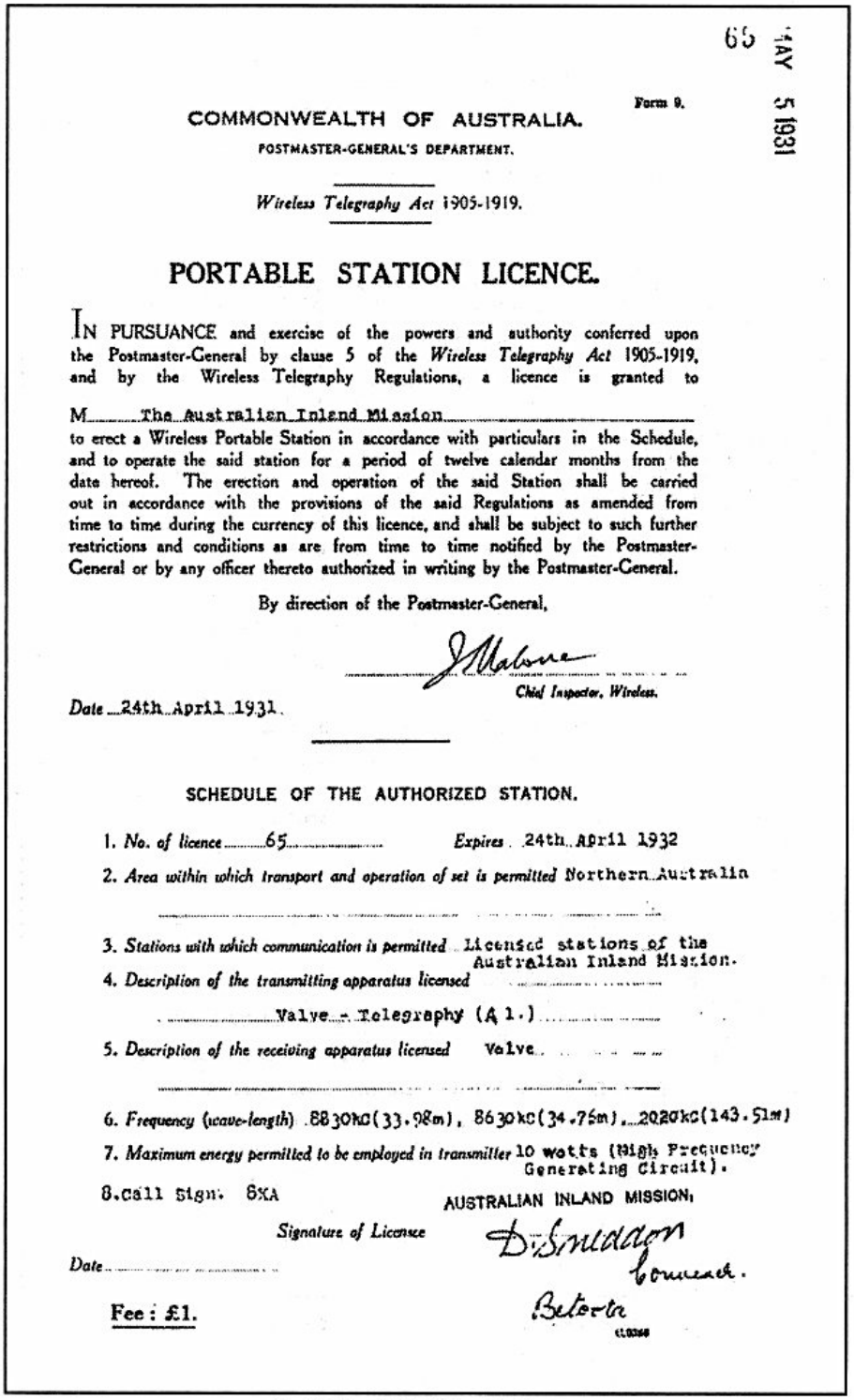
needed to power it would not go flat too quickly. Hence the receiver used two A141 space charge tetrode valves with 9 volts on the plates. The filaments were powered from a 1.5 volt battery.

The receiver used one A141 as a regenerative detector, followed by a transformer coupled audio stage. The total gain of the audio section was around 15 times, as the valve had a gain of around 4½ times and was used with a 1:3½ audio transformer. Not being a high performance set, it only fed headphones.

The receiver tuning ranges were nominally 550 kHz to 1500 kHz and a short-wave band nominally covering either 1.5 to 3 MHz or 2 to 4 MHz, which included 2230 kHz. To effect the change from the broadcast band to short-wave it was only necessary to pull the receiver coil out, tip it upside down and plug it in again. This way the plug in coil could never be mislaid as it was always in the set.

The pedal radio was housed in a "coffin" style wooden cabinet measuring nominally 18 inches (46 cm) wide x 7½ inches (19 cm) high x 9½ inches (24 cm) deep. The set was turned on by raising the lid and turned off by closing it. The changeover from receive to transmit was accomplished by a large multi-function switch that Traeger built for the job. Later models had an even larger switch. The batteries were all contained within the set (see photo next issue). Note, the transmitter valve is missing in the photograph. The set and Morse key sat on the table while the pedal generator was attached to the floor. During 1929 there were a total of six of this model set put into operation within a radius of 600 kilometres of Cloncurry in Queensland.

Perhaps you had believed, as had I, that "pedal radios" were powered exclusively by the pedal generator. This was not so, as it was not practical to operate the complete set from the generator, as it would have required several complicated windings on the armature with commutators for each winding. With variation in pedalling speed, the filament voltages would have varied which would have caused the transmitter output to vary, but problems would have been even more obvious in the receiver. The regeneration control was critical to adjust in this set and would have been just below the point of oscillation for best reception. With variation in pedalling speed, the set would be likely to burst into oscillation, or drop off in gain - a difficult trait for unskilled operators to deal with. Additionally, sparking at the generator armature would cause intolerable interference to reception, and operators would have become exhausted if they had to pedal continuously for up to an hour. It was effort enough to pedal while transmitting.



65 MAY 5 1931

Form 9.

COMMONWEALTH OF AUSTRALIA.

POSTMASTER-GENERAL'S DEPARTMENT.

Wireless Telegraphy Act 1905-1919.

PORTABLE STATION LICENCE.

IN PURSUANCE and exercise of the powers and authority conferred upon the Postmaster-General by clause 5 of the *Wireless Telegraphy Act* 1905-1919, and by the Wireless Telegraphy Regulations, a licence is granted to

M..... The Australian Inland Mission.....

to erect a Wireless Portable Station in accordance with particulars in the Schedule, and to operate the said station for a period of twelve calendar months from the date hereof. The erection and operation of the said Station shall be carried out in accordance with the provisions of the said Regulations as amended from time to time during the currency of this licence, and shall be subject to such further restrictions and conditions as are from time to time notified by the Postmaster-General or by any officer thereto authorized in writing by the Postmaster-General.

By direction of the Postmaster-General,

J. Malone

Chief Inspector, Wireless.

Date 24th April 1931.

SCHEDULE OF THE AUTHORIZED STATION.

1. *No. of licence* 65 *Expires* 24th April 1932
2. *Area within which transport and operation of set is permitted* Northern Australia
3. *Stations with which communication is permitted* Licensed stations of the Australian Inland Mission.
4. *Description of the transmitting apparatus licensed* Valve - Telegraphy (A 1.)
5. *Description of the receiving apparatus licensed* Valve
6. *Frequency (wave-length)* 8830kc(33.98m), 8630kc(34.75m), 2020kc(143.51m)
7. *Maximum energy permitted to be employed in transmitter* 10 watts (High Frequency Generating Circuit).
8. Call Sign. 6XA

AUSTRALIAN INLAND MISSION.

Signature of Licensee Dr. Smeaton Hunter.

Date

Fee: £1.

Betoota

Fig 2. The 1931 Betoota licence

Pedal radio failures and the upgraded pedal radio

The pedal radios were proving to be doing just what the Reverend John Flynn had hoped they would do. However, problems soon arose. Termites loved eating the wooden cabinets. If they weren't being eaten they were warping in the hot humid atmosphere around Cloncurry in Queensland. Technical problems became apparent too. The receiver was proving to be difficult to operate by non technical people as it had barely enough gain to receive the 50 watt base station at Cloncurry, even with critical adjustment of the regeneration control.

It had become obvious to both the Cloncurry base operator and Alf Traeger that a second frequency near 10 MHz was needed for effective communications by day or night, over ranges to 600 kilometres or more. Hence, application was made to the PMG department for a second frequency. The PMG actually granted three frequencies, two 8 MHz frequencies in addition to the 2 MHz frequency (as shown on a 1931 licence).

Early in 1930 Traeger decided that an urgent re-build was necessary to achieve the performance and reliability that he had hoped for. Traeger, with some help from Kauper, decided to replace the receiver with a three valve unit using A109 valves. The receiver was of a more conventional design than the earlier unit with a regenerative detector and two stages of transformer coupled audio. This gave a total audio gain approaching 700 times that was a great improvement over the previous set with an audio gain of 15. The receiver tuning range was extended from 550 kHz to around 10 MHz to cover all the frequencies that the flying doctor service would use, plus give the folk at these isolated homesteads the opportunity to hear what was going on in the wide world.

Traeger was concerned about the reliability of the transmitters, as there had been an instance where a pedal radio transmitter had failed, resulting in the loss of a life. He decided that the transmitting section of the pedal radio should in fact be two transmitters; one on a nighttime frequency and one on a daytime frequency. This meant that if one transmitter should break down, communications should be possible at sometime during the ensuing 24 hours. He selected an A615 for the transmitter valve. Why he didn't continue with the B205 is unknown as it appeared to be very suitable for the job. Of the three frequencies allocated for the use of the flying doctor service, 2020 kHz and 8630 kHz were selected and used at Cloncurry. The third frequency was ultimately used in Western Australia.

With the addition of the second frequency, it was necessary to alter the radiating system. The 8 MHz frequency was somewhere near a harmonic of the 2 MHz frequency, but not exactly. The antenna was made to suit the 2 MHz frequency, but the transmitter switched the counterpoises so the radiating

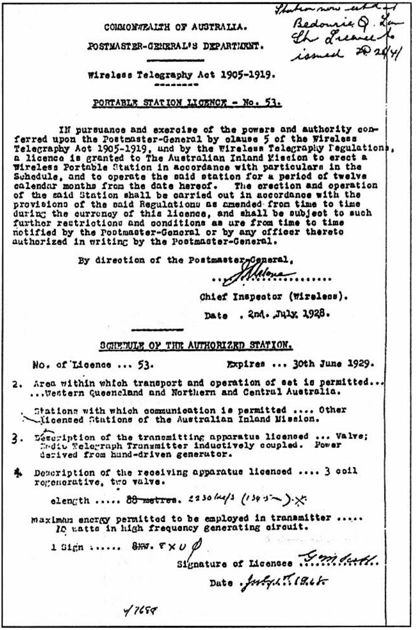
system was resonant on both frequencies at the flick of a switch. Initially the aerial/antenna and the counterpoises had to be resonated by adjusting the lengths of each individual wire, which was a laborious time consuming job.

Later sets had two internal variable tuning gangs, one in series with each counterpoise. Each counterpoise was made physically longer than a resonant length. The capacitor was then adjusted to electrically shorten the particular counterpoise to obtain resonance of the whole radiating system. Resonance in the transmitter tuned circuit and the counterpoise was necessary for the set to put out a good signal. These two controls were adjusted for maximum brilliance of a small pea lamp in series with the antenna. This modification reduced the tuning time for the radiating system to minutes rather than hours.

These replacement sets were built in a larger metal cabinet, which accommodated the much larger transmitter(s) and receiver. The batteries were removed from the cabinet and usually sat under the table. The receiver used a 45 volt battery, despite the fact that electrical leakage may have been higher than desirable. However, the insulation in the batteries was improving all the time. The transmitter filaments required at least four (usually five) No 6 cells in series, while the receiver filaments needed a single No 6 cell to light them.

The original sets were dismantled after being taken out of service, so none are in existence. However, the replacement Augustus Downs set is on display at John Flynn Place in Cloncurry. To my knowledge, this is the only one of this model still in existence and hence the oldest flying doctor radio. I was fortunate enough to be able to inspect this set and draw its circuit, which is shown in this article.

I built a replica of the transmitter and found that the output power of the transmitter was between 1 and 1.5 watts - depending on how hard you pedalled. No doubt many wonder how such low powered transmitters could communicate effectively over such long distances (up to 600 kilometres, or more, from an out-station to the base station in Cloncurry). The answer put simply is - with difficulty. However, several things did assist in making communications possible and practical, and they were -



COMMONWEALTH OF AUSTRALIA.

POSTMASTER-GENERAL'S DEPARTMENT.

Wireless Telegraphy Act 1905-1919.

PORTABLE STATION LICENCE - No. 53.

IN pursuance and exercise of the powers and authority conferred upon the Postmaster-General by clause 5 of the Wireless Telegraphy Act 1905-1919, and by the Wireless Telegraphy Regulations, a licence is granted to The Australian Inland Mission to erect a Wireless Portable Station in accordance with particulars in the Schedule, and to operate the said station for a period of twelve calendar months from the date hereof. The erection and operation of the said Station shall be carried out in accordance with the provisions of the said Regulations as amended from time to time during the currency of this licence, and shall be subject to such further restrictions and conditions as are from time to time notified by the Postmaster-General or by any officer thereto authorized in writing by the Postmaster-General.

By direction of the Postmaster-General,

....

Chief Inspector (Wireless).

Date . 2nd. July. 1928.

SCHEDULE OF THE AUTHORIZED STATION.

No. of Licence ... 53. Expires ... 30th June 1929.

2. Area within which transport and operation of set is permitted... ...Western Queensland and Northern and Central Australia.

Stations with which communication is permitted .... Other licensed Stations of the Australian Inland Mission.

3. Description of the transmitting apparatus licensed ... Valve; Radio Telegraph Transmitter inductively coupled. Power derived from hand-driven generator.

4. Description of the receiving apparatus licensed .... 3 coil regenerative, two valve.

elength ..... ~~88 metres~~.

Maximum energy permitted to be employed in transmitter ..... 10 watts in high frequency generating circuit.

1 Sign ...... 8HW.

Signature of Licensee ....

Date .

Fig 3. The original "baby" licence.

(1) the radiating system at the out-stations was extremely efficient,

(2) not as many radio stations were using short wave at that time, hence less man made interference,

(3) morse code transmissions are detectable at much lower signal strengths than voice transmissions,

(4) the sunspot cycle was coming to a peak (1934),

(5) the use of day and night frequencies, and

(6) there was a very competent and patient operator at the base station at Cloncurry.

to be continued in October edition of *Amateur Radio*

HF Predictions

by Evan Jarman VK3ANI
34 Alandale Court Blackburn Vic 3130

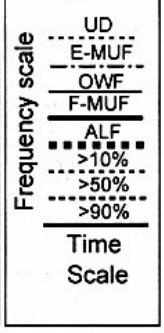
These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.
These frequencies as identified in the legend are:-

- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

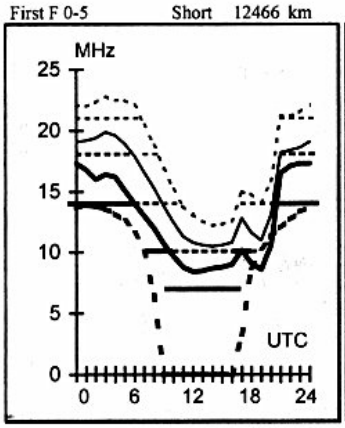
Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.
These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

September 2005
T index: 24

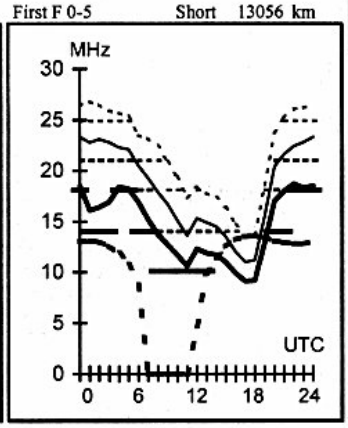
Legend



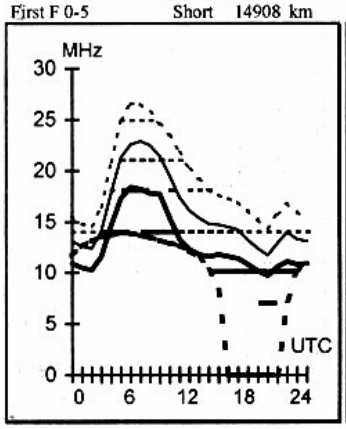
Adelaide-Anchorage 30
First F 0-5 Short 12466 km



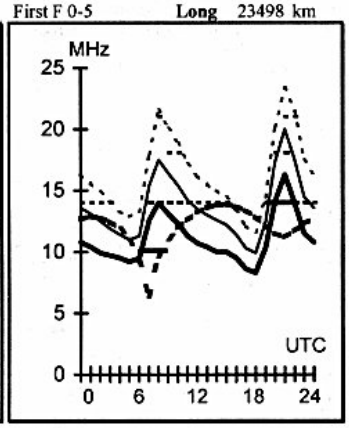
Brisbane-Lima 122
First F 0-5 Short 13056 km



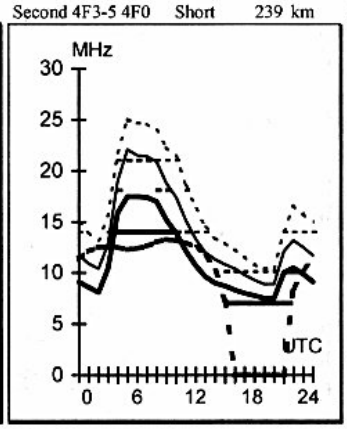
Adelaide-Budapest 305
First F 0-5 Short 14908 km



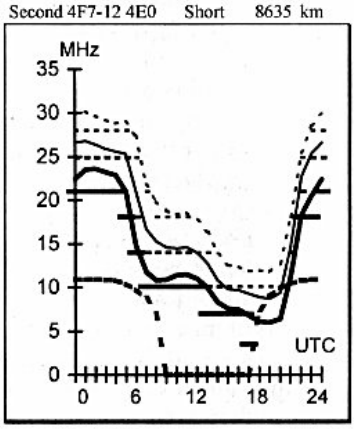
Brisbane-London 147
First F 0-5 Long 23498 km



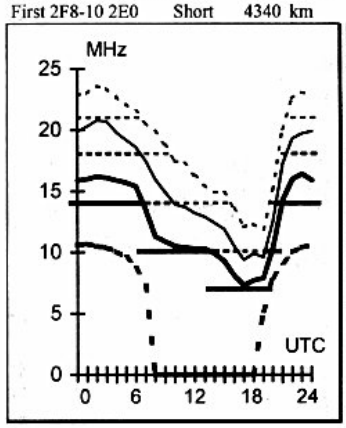
Canberra-Lusaka 239
Second 4F3-5 4F0 Short 239 km



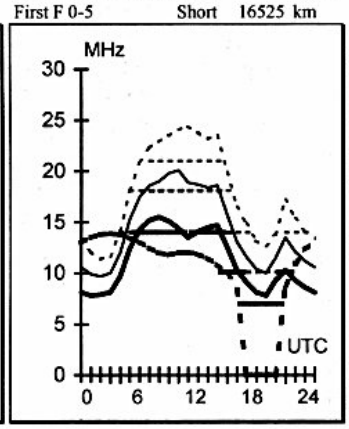
Darwin-Honolulu 65
Second 4F7-12 4E0 Short 8635 km



Adelaide-Suva 75
First 2F8-10 2E0 Short 4340 km



Brisbane-London 327
First F 0-5 Short 16525 km



Canberra-Manila 327
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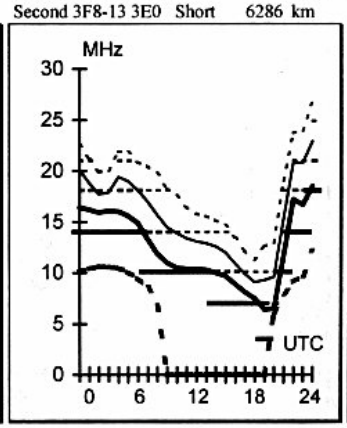

Darwin-Johannesburg 241
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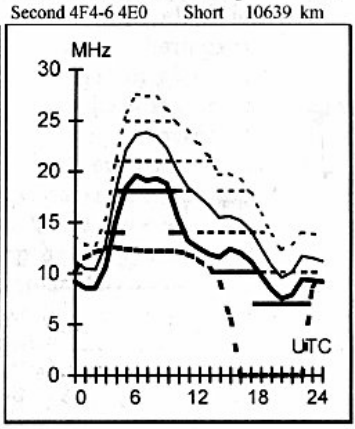
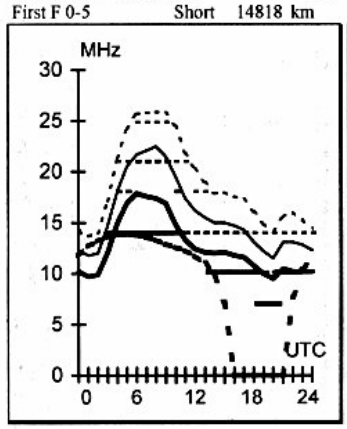
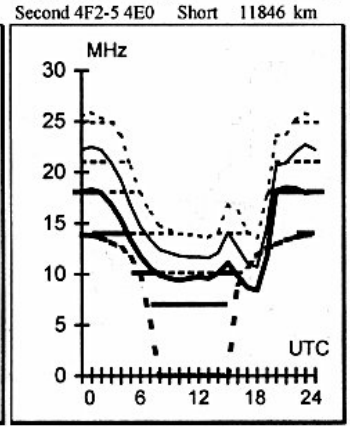


Adelaide-Warsaw 312
First F 0-5 Short 14818 km



Brisbane-Seattle 44
Second 4F2-5 4E0 Short 11846 km



Canberra-Ottawa 59
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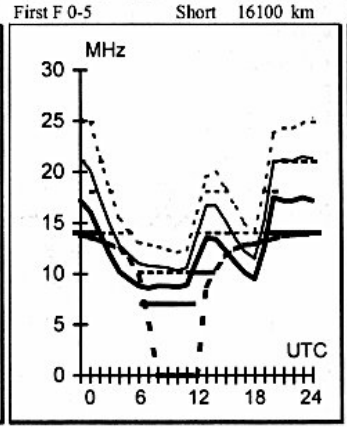
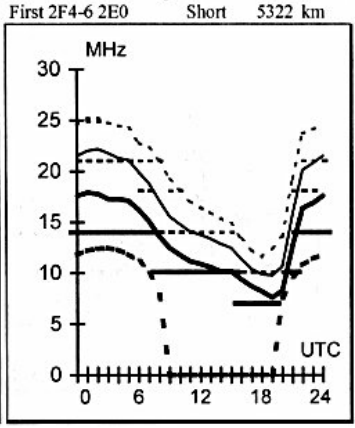
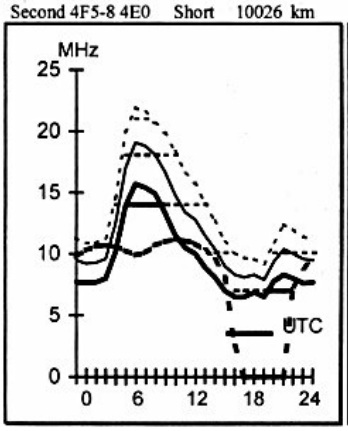


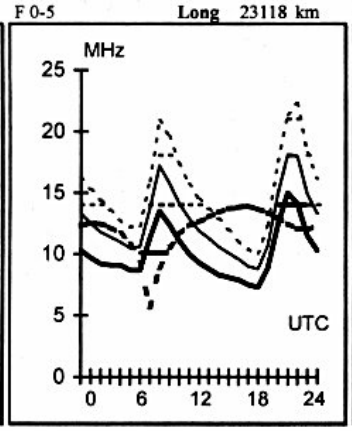
Darwin-Wellington 135
First 2F4-6 2E0 Short 5322 km



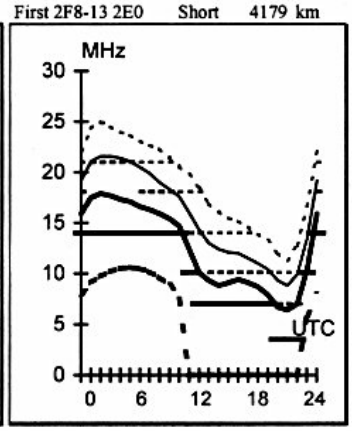
Hobart-Capetown 220
Second 4F5-8 4E0 Short 10026 km



Melbourne-London 131
F 0-5 **Long** 23118 km



Perth-Kuala Lumpar 336
First 2F8-13 2E0 Short 4179 km



Sydney-Los Angeles 61
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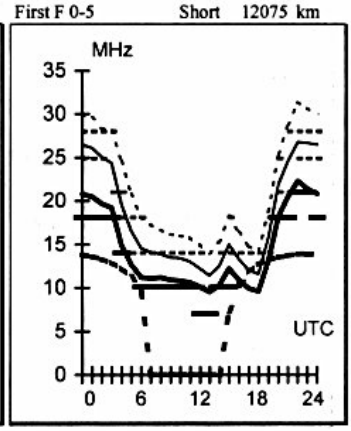

Hobart-New York 80
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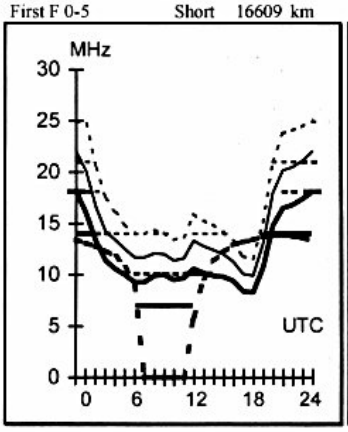

Melbourne-London 311
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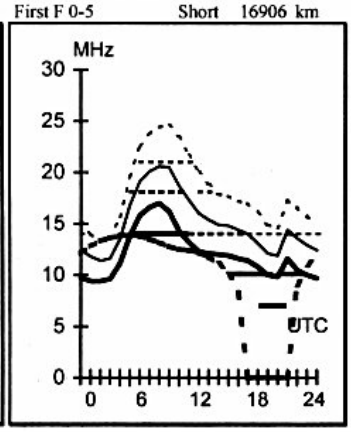

Perth-Rio de Janeiro 203
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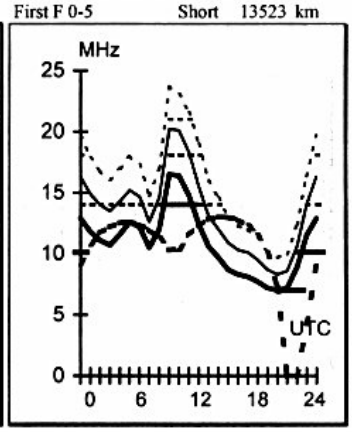

Sydney-RawalpindiLondo 304
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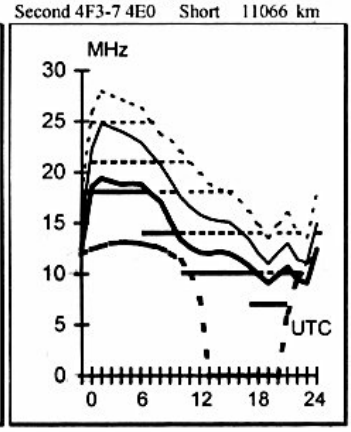

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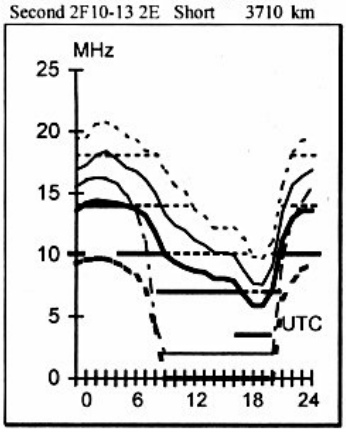
Second 2F10-13 2E Short 3710 km



Melbourne-Pretoria 234
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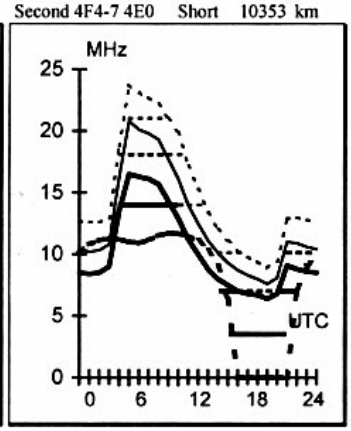
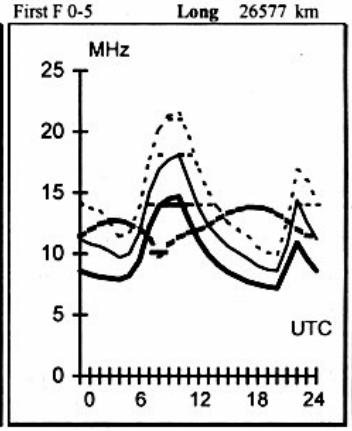
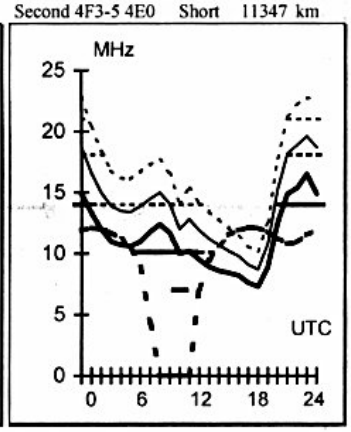


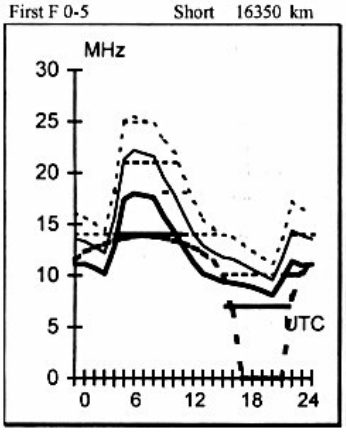
Perth-Stockholm 144
First F 0-5 **Long** 26577 km



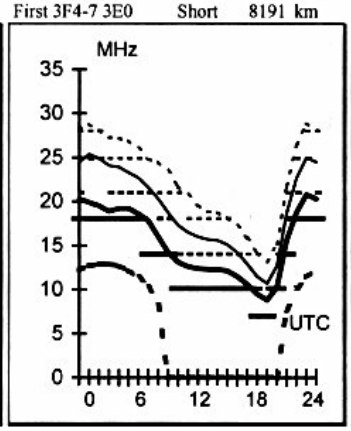
Sydney-Santiago 145
Second 4F3-5 4E0 Short 11347 km



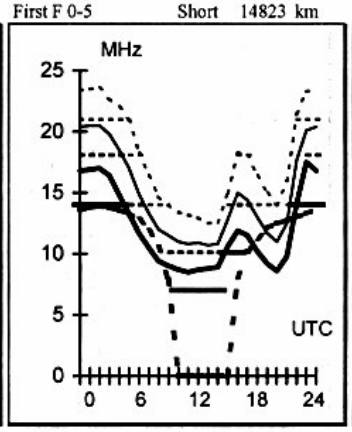
Hobart-Rome 284
First F 0-5 Short 16350 km



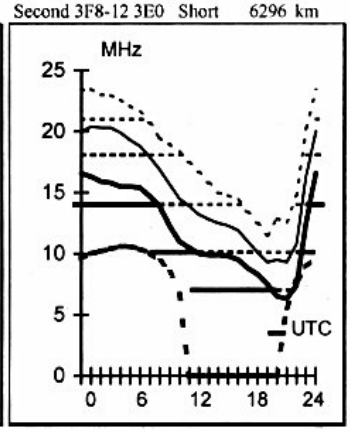
Melbourne-Tokyo 356
First 3F4-7 3E0 Short 8191 km



Perth-Vancouver 50
First F 0-5 Short 14823 km



Sydney-Singapore 298
Second 3F8-12 3E0 Short 6296 km



Hamads *classifieds* FREE

FOR SALE ACT

•**Icom IC-208H** 2m/70cm dual band FM transceiver. The radio is supplied with a mounting bracket with hardware, a back-lit DTMF hand mic with up/down controls, separation cable, and a fused DC power cord, weight 1.2kg, $480. Contact Rod VK1HAI 0429 003 200

FOR SALE NSW

•**HYMOUND model 100** semi-automatic Morse key (bug). Nice condition and precise keying, $80 plus postage. Ric Havyatt VK2PH. Email: valaric@optusnet.com.au Phone 02 9817 0337

•**Sangean ATS-505** General Purpose MW/FM/SW portable radio receiver with SSB capability. As new with case and handbook, $100 plus freight. Trevor VK2TO QTHR, email radmark@ozemail.com.au, mobile 0414 301 106

FOR SALE VIC

•**Satellite System:** Brand new, all components in original cartons. 3.6 m Orbitron Mesh Dish with polar mount, 60cm Actuator Arm, Echostar 8700 Analog Rec/Positioner with RF control. Chaparral Micropak 25 Degree C Band LNB and Feed Horn. 26 m RG11, 26 m each of 3 core and 7 core control cable. All instruction and assembly manuals. Buyer to collect, inspection can be arranged. Originally cost $2450, make a reasonable offer. Contact Keith 03 5243 5184 Geelong Radio & Electronics Society VK3ANR

•**7 inch TFT video monitor**. Brand new NTSC/PAL 16:9 or 4:3 format. Wireless remote, two video inputs. Standard radio in-dash size. Digital clock, 7.5W consumption, $216 ono. Contact Ian VK3AQU QTHR or 0418 579 422. lorian@netc.net.au

•**Military HF receiver Collins R-105-ARR-15** used as replacement for BC-348 in WW2 Aircraft. Complete with mounting rack. No modifications and with original dynamotor, $380. NOTE: A VK7 amateur emailed re this receiver in April. Please contact again if interested as address inadvertently deleted while overseas. **Collins designed R-392 receiver** (made by Stewart Warner). Complete with LS-116 speaker, power and audio output plug and some spare valves. Operates on 28 V DC, no mods, $340. GC. **BC-224 D receiver.** This is the 12V equivalent of the BC-348 and is made by RCA. S/N 175. A rather rare version as it was made without the 200-500 kHz band. Full coverage in 6 bands is 1.5 to 18 MHz. It is in EC, - no mods, original dynamotor. No vandalising. Front panel refinished in wrinkle black per original, $480. **Shock mount for BC-348** receiver **FT-154** with power PL-Q103 plug attached, $190. **BC-348 Q receiver,** original condition with own dynamotor. No mods, no vandalising, $360. Packing and freighting extra. Photos emailed on request. Pete Williams VK3IZ QTHR jupete@bigpond.net.au

WANTED VIC

•**Transceiver amateur bands** 3.5 MHz, 7 MHz, 14 MHz, 21 MHz, prefer with SSB, outside antenna. **Course material** in written form for obtaining amateur licence and call sign, prefer with SSB. Bob Greenfield, 43 McMillan St, Morwell Vic 3840

FOR SALE QLD

•Cushcraft R7 vert, 10-40 inc manual, VGC. $250 ono. **TH3JR-S Tri-Band** and BN-86 Balun inc manuals GC $250 ono. Ph. 07 3356 9816 or email: tarah@powerup.com.au

WANTED SA

•**Diode matrix board for Icom IC-22S.** John VK5CJM, QTHR Phone 08 8531 2145 or melflo@austarnet.com.au

•**Dead Yaesu FT-270R** transceiver (or parts) in a condition which will allow me to replace the leaking LCD display in my otherwise working set. Jim VK5JST 08 8382 0504 endsodds@internode.on.net

WANTED WA

•**Ten Tec Omni C and external VFO.** Enthusiastic CW operator is looking for Ten Tec Omni C line Ð Omni C Tx/Rx (546C) with 500 Hz filter, external VFO (243) and power supply/speaker (255). Please contact me if you have any of the above. Steve Ireland, VK6VZ, Phone 08 9298 9330, email: vk6vz@arach.net.au

MISCELLANEOUS

•Is anybody driving to Brisbane from Sydney? Would pay 2/3 petrol costs for the trip if they would pick up one item of ham gear from Mulgoa 60 km west of Sydney. email briley@thehub.com.au, phone 0414 954 992 VK4ABZ

• **The WIA QSL Collection requires QSLs.** All types welcome, especially rare DX pictorial cards, special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765, tel. (03) 9728 5350

About hamads....

- Hamads may be submitted by **email (preferred)** or on the **form on the reverse of your current Amateur Radio address flysheet.** Please print carefully and clearly, use upper AND lower case.
- Separate forms for For Sale and Wanted items. Please include name, address STD telephone number and WIA membership number if you do not use the flysheet.
- Deceased estates Hamads will be published in full, even if the ad is not fully radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from those who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising (Trade Hamads) are prepayable at $25.00 for four lines (twenty words), plus $2.25 per line (or part thereof), Forty word maximum, minimum charge of $25.00. Cheques are to be made out to: WIA Hamads.
- Copy typed or printed clearly please, and received by the deadlines shown on page 1 of each issue of Amateur Radio.

Email: ***newunltd@bigpond.net.au***

Postal: ***Newsletters Unlimited, PO Box 431, Monbulk Vic 3793.*** **Fax:** ***03 9756 7031***

TRADE PRACTICES ACT
It is impossible for us to ensure that the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore, advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are strictly complied with.

VICTORIAN CONSUMER AFFAIRS ACT
All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

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The Amateur Service:

a radio communications service for the purpose of self training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique with a personal aim and without any pecuniary interest. 1.56 ITU Radio Regulations.

The Wireless Institute of Australia represents the interests of all amateurs throughout Australia.

WIA membership fees are: ★ **$ 75 for full members (F grade),** ★ **$ 70 for pensioners and students (G and S grade), and** ★ **$ 50 for membership without 'Amateur Radio' (X grade).** ***Payment direct to National office.***

National Office	Contact	News Bulletin Schedule
10/229 Balaclava Road, Caulfield North VIC 3161, PO Box 2175 Caulfield Junction Vic 3161 Australia	Phone 03 9528 5962, Fax 03 9523 8191, 10am to 4pm daily, nationaloffice@wia.org.au http://www.wia.org.au	Subject to change see www.wia.org.au follow national news prompts. Contact nationalnews@wia.org.au National VK1WIA news is distributed to all states.

Advisory Committees	Contact	News Bulletin Schedule
VK1 Australian Capital Territory VK1WX Alan Hawes VK1ZPL Phil Longworth VK1ET John Woolner VK1GH Gil Hughes	secretary@vk1.wia.ampr.org	Sundays at 11.00 am VK1WIA 7.128, 146.950,438.050 Canberra Region Amateur Radio Club Email newsletter will be sent on request to president@vk1.ampr.org
VK2 New South Wales VK2QV Chris Flak VK2XCD Chris Devery VK2BFN Adrian Clout	Phone 02 9689 2417	VK2WI - Sunday 1000 and 1930 hours local.1.845; 3.595; 7.146; 10.125; 14.170; 28.320, 52.525; 145.600; 147.000; 438.525; 1273.500 megahertz. Plus regional relays. VK1WIA news included in the morning
VK3 Victoria VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill	Phone 03 9885 9261 advisory@wiavic.org.au	VK1WIA Sunday 11.0am via HF and major VHF / UHF rptrs
VK4 Queensland VK4ERM Ewan McLeod VK4ZZ Gavin Reibelt	Phone 07 3221 9377 ewan.mcleod@bigpond.com	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rptrs
VK5 South Australia and Northern Territory VK5NB Jim McLachlan VK5APR Peter Reichelt VK5ATQ Trevor Quick	Phone 08 8294 2992 jimac@picknowl.com.au peter.reichelt@bigpond.com vk5atq@chariot.net.au	VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.
VK6 Western Australia VK6NE Neil Penfold VK6XV Roy Watkins VK6OO Bruce Hedland-Thomas	Phone 08 9351 8873 http://www.vk6.net/ advisory@vk6.net vk6ne@upnaway.com vk6xv@bigpond.net.au	VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz, Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury).147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900,147.000, 147.200, 147.250 and 147.350 MHz..Also in "Real Audio" format from the VK6 WIA website
VK7 Tasmania VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	Phone 03 6234 3553 phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	VK1WIA Sunday 9am on VK7WI network: 3.570MHz LSB, 146.700 MHz FM (VK7RHT South), 53.825MHZ FM (VK7RAD South), 147.000MHz FM (VK7RAA North), 146.750 FM & 53.825MHz (VK7RNW North West), 146.625 MHz FM (VK7RMD North West), UHF CB Channel 15 (Hobart) and 27MHz CB - 27.225MHz LSB (Hobart). Followed at 9:30am with VK7 Regional News Broadcast also on 7.090MHz LSB & 14.130MHz USB

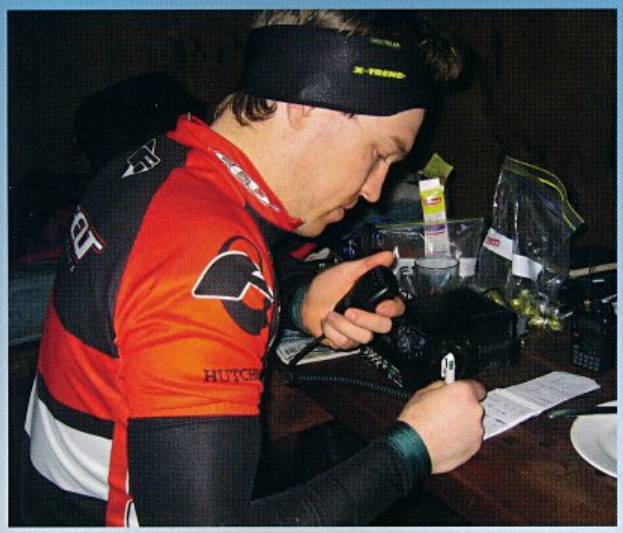
Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.

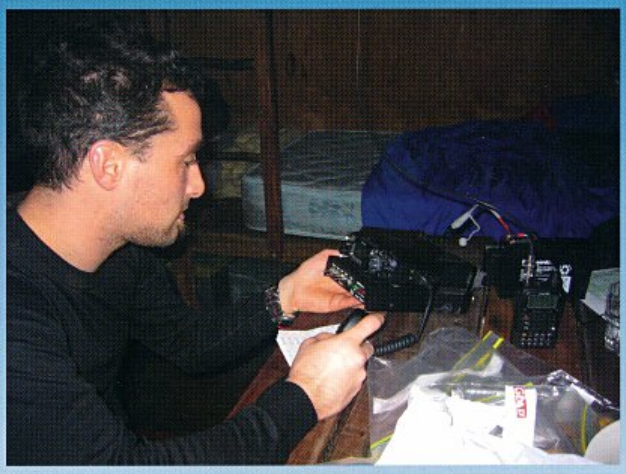
High country adventurers

Stephen Warrillow VK3JNH

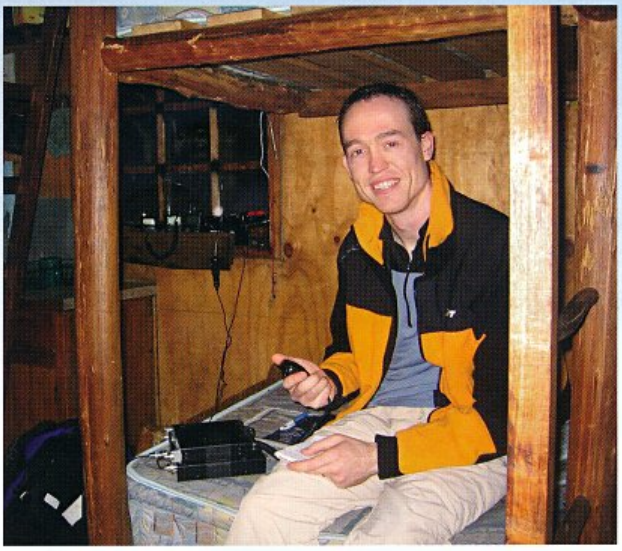
The Bogong High Plains in the Victorian High Country is a picturesque place no matter what time of year. Every winter, this place is transformed by a blanket of deep snow and it is truly beautiful.



VK3JNH



VK3HFI on 80

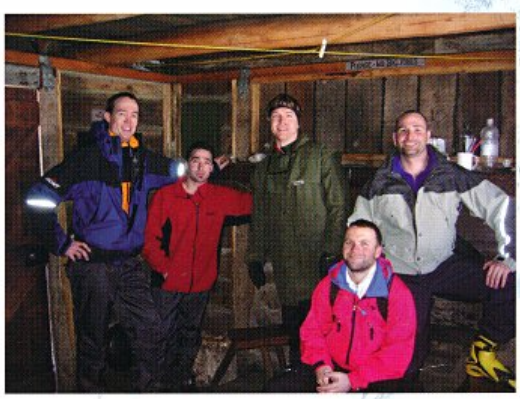


VK3JPA on bunk

Cross-country skiing off the trails where one can enjoy the unique experience of skiing on virgin powder snow down unmarked slopes and gullies requires preparation, basic fitness and a sense of adventure. We have enjoyed exploring the Bogong High Plains for many years now with annual trips in summer and winter whenever we are able.

Amateur radio has, on each occasion, brought an added dimension to these adventures. From providing essential means of communication between party members on the trip and family at home, to acting as a back up means of emergency communication in this isolated region, portable and hand-held gear has played an important role on each trip.

Extended back-country cross-country skiing trips necessitate each member of the party to be self-reliant. All food, clothing and equipment must be carried in a rucksack while skiing through what can be fairly rugged terrain.



See page 12 for the story of the Alpine adventure of Stephen Warrillow VK3JNH (author), Gerard Warrillow VK3JPA (photographer), Matt VK3HFI, Brendan M, Matt W, Steve V and Lindsay

ICOM'S GREAT CHAMPIONS

ICOM FLAGSHIP TRANSCEIVER

IC-7800 HF*6m

• Four 32-bit floating point DSP units • +40dBm ultra high intercept point • Automatic tracking pre-selector • Two completely independent receiver circuits • 200W output power at full duty • Ultra high frequency stability • 7-inch wide color TFT LCD • Multi function spectrum scope • RTTY / PSK31 operation without PC connection • Professional 6m receiver • Digital Voice Recorder • CF memory card

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Sharp & soft IF filter shape • New receiver gives +30dBm third-order intercept point • One-touch record/play Digital voice memory • Extended 1/4 Tuning step & BPF functions for SSB-D mode • 32-bit floating-point DSP and 24-bit AD/DA converter • SSB/CW sychronous tuning • 5-inch color TFT LCD • Built-in antenna tuner • Customisable filter shap • No optional filters to buy

IC-706MKIIG

The amazing evolution of the legendary 706

Now includes 70cm @ 20W and 50W on 2m Standard feature dsp • Built in sub tone encoder & decoder Tone scan • Mosfet PA • You get base station performance and features in a mobile rig sized package

NEW

IC-2200H

High (65W) Power Output • DTCS & CTCSS Tone Squelch • DTMF Encode & Decode (with optional UT108) • Digital Voice & Data Communication (with optional UT118 • 207 Alphanumeric Memories

IC-208H FM Dual Band Transceiver

Dual Band Features at a Single Band Price • 55W / 2m, 50W / 70cm • Built-in CTCSS and DTCS Tone Squelch • Detachable Front Panel standard (Req. OPC-600/601 Option) • 9600 bps Packet Operation • 512 Memory Channel • Standard Mic. Supplied: HM133.

NEW

IC-T90A A new 5W Triband handheld

VHF/UHF FM 2M, 6M, & 70CM Wideband receive 495 KHz - 1 GHz 555 Alphanumeric memories • 13 Scan modes DTCS & CTCSS encode & decode DTMF encoder (10 memories) Wide/narrow transmit capability.

IC-V82 7w VHF Handheld

207 Alphanumeric memories • DTCS & CTCSS Tone Squelch • DTMF encoder • Digital voice and data communication (Req. UT114 option) • GPS receiver can be connected • BNC type antenna connector

ICOM 40

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